VOL. XXXII. No. 4 APRIL 1947

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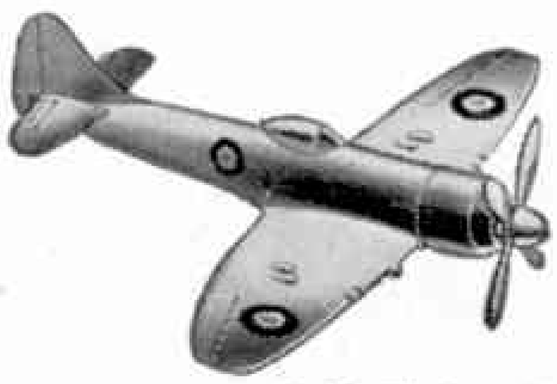

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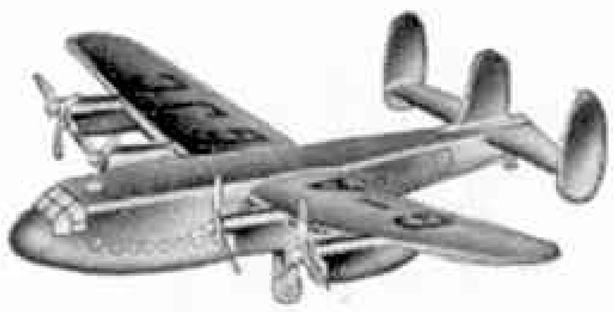

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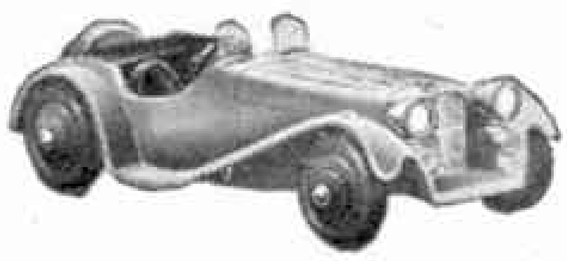

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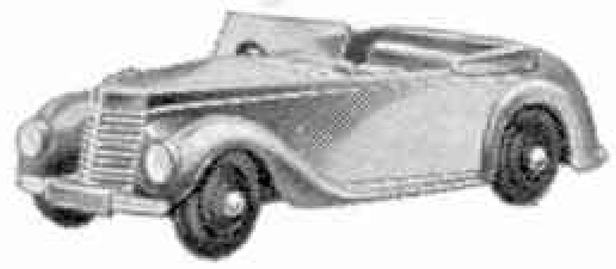

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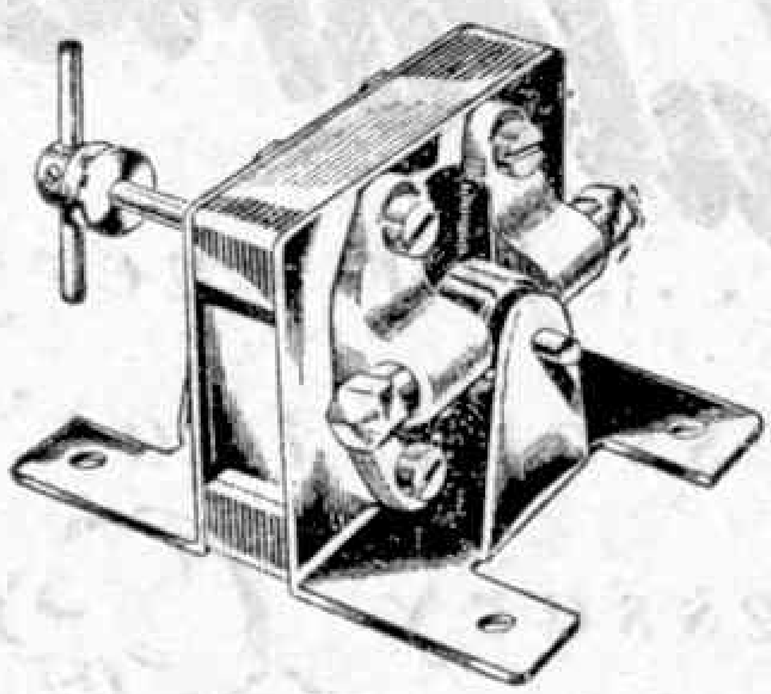

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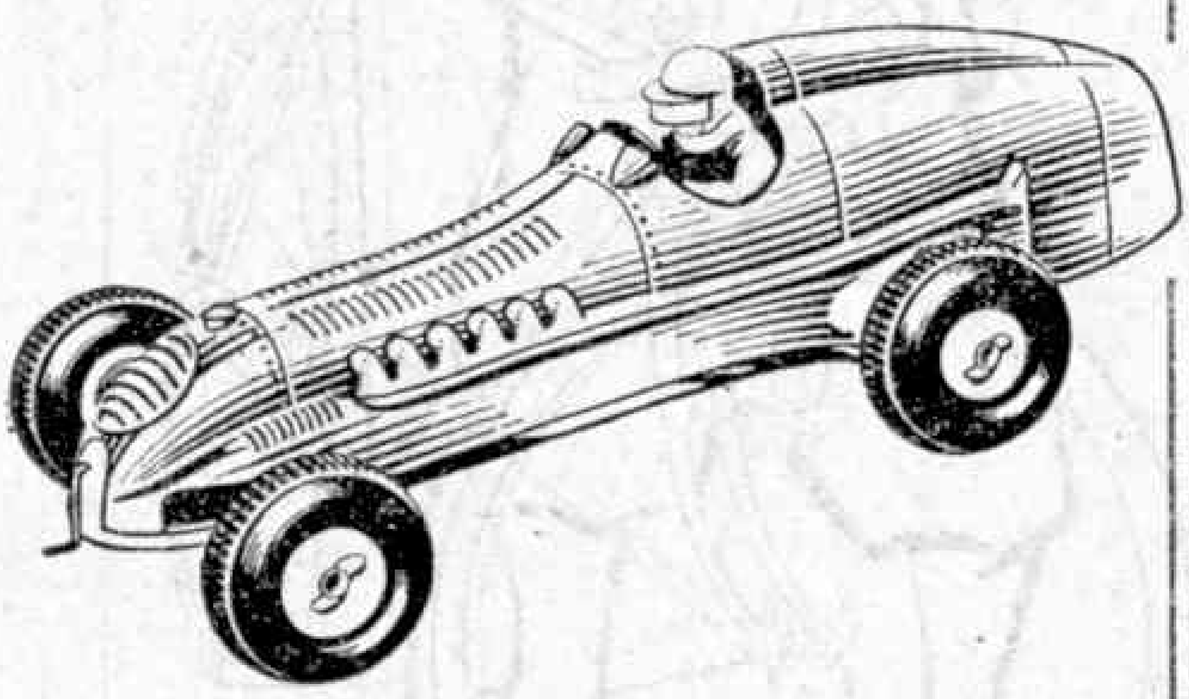

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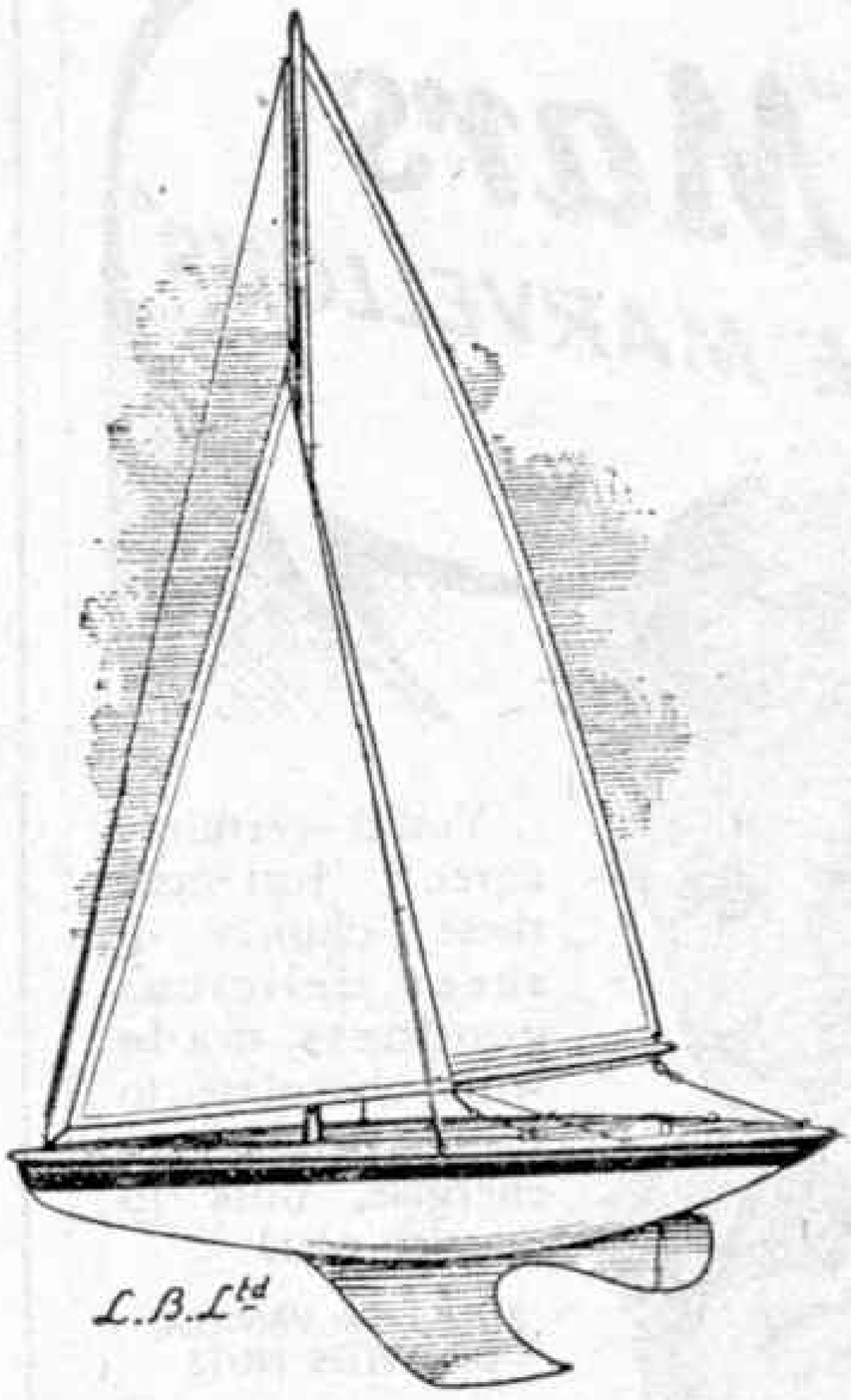

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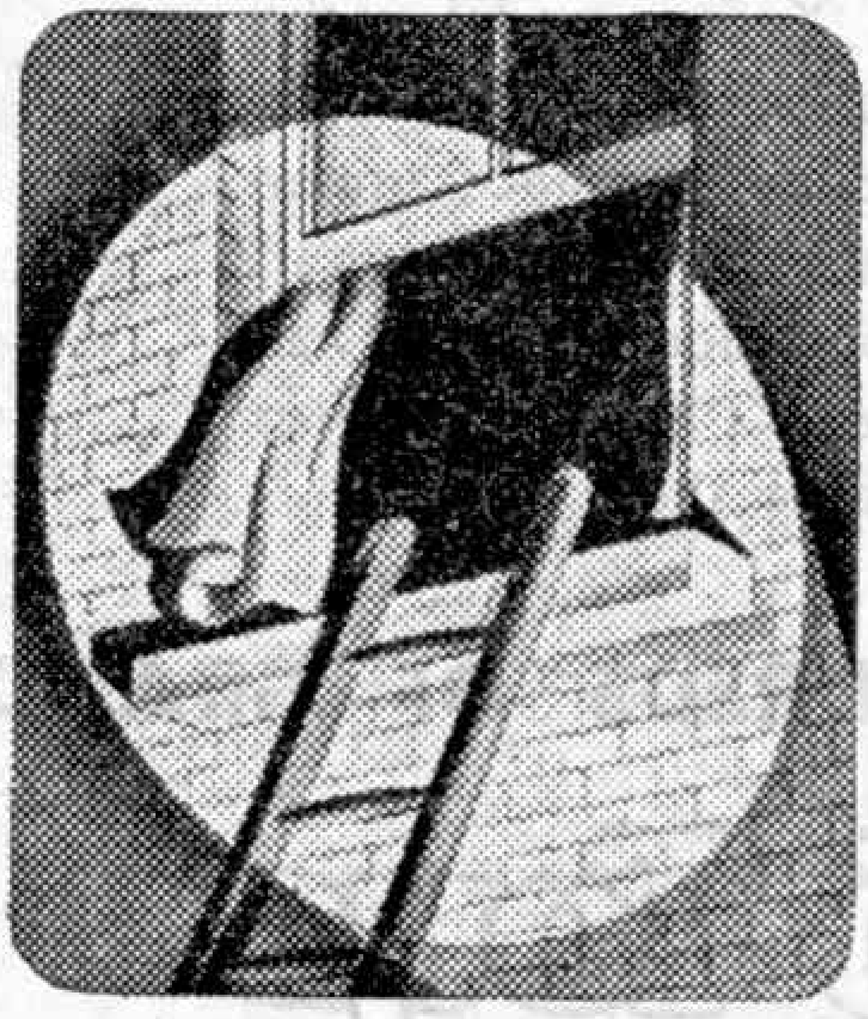

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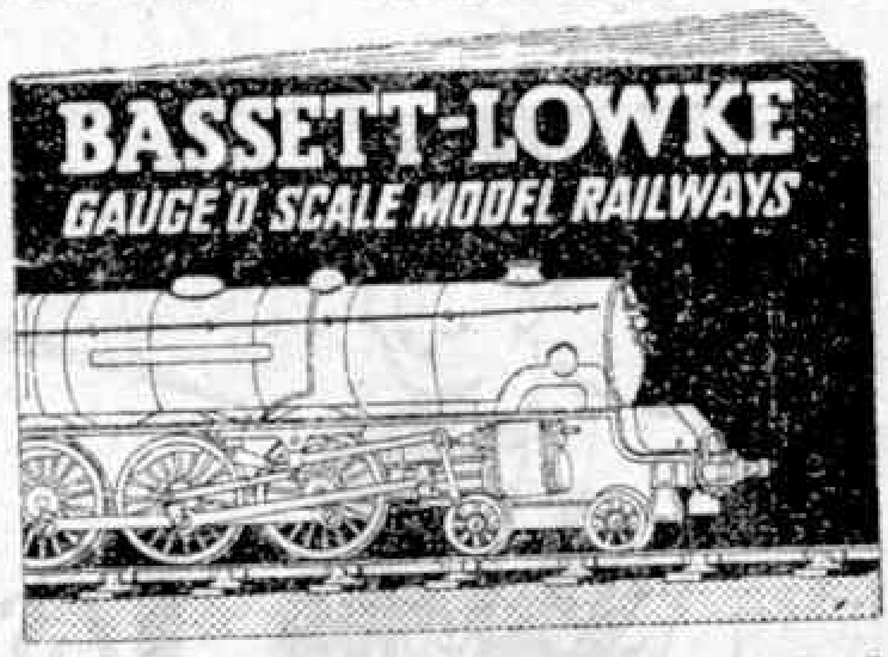

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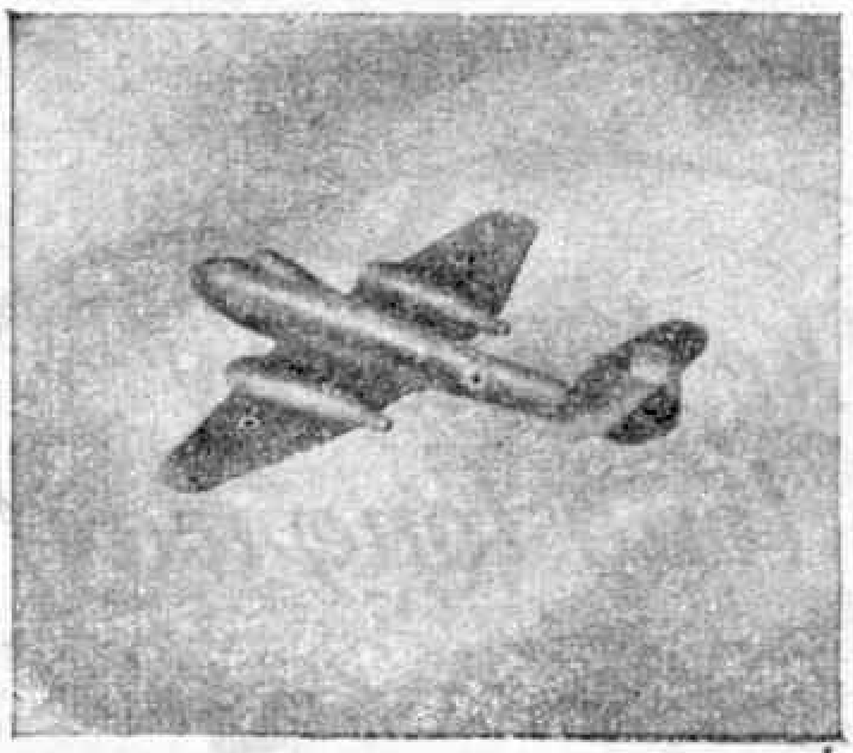

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Next Month: "SAFETY IN THE AIR." By John W. R. Taylor

MECCANO MAGAZINE

Editorial Office:
Binns Road
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Vol. XXXII
No. 4
April 1947

With the Editor

The "M.M." Again Smaller

When I announced in January that I was able to increase the number of pages in the *"M.M."*, I looked forward to this increase being permanent and followed by further increases later. My hopes have been short-lived however. This month I have to reduce the *"M.M."* by eight pages and I am afraid that this reduction may apply for some time. It is all due, the Controller of Paper tells me, to the Fuel position, and the reductions in the supply of paper are necessary in the national interest.

The result of the cut in the number of pages has been to cause the abandonment of certain articles. This is very unfortunate but I am sure that readers will appreciate my position. Next month I shall have had time to adjust the contents of the paper rather better.

Coal Saving on Irish Sea Routes

Nearly 250 tons of coal per week are being saved by the introduction of the motor vessel *"Princess Victoria,"* using marine diesel oil, into service on the L.M.S. Stranraer-Larne route last month. The new vessel, which is of 2,300 tons and has a service speed of 19 knots, replaces on the service the coal-fired *"Princess Margaret."* The *"Princess Victoria"* is a passenger and motor-car carrying vessel built by William Denny and Brothers Ltd., Dumbarton, in replacement of the former *"Princess Victoria,"* sunk on war service in 1940.

By putting the Stranraer-Larne oil-burning vessel *"Princess Maud"* on the Holyhead-Kingstown route and laying up a coal-fired steamer on that route, the L.M.S. are saving 460 tons of coal per week. The reduction in the Heysham-Belfast sailing resulted in a saving of 360 tons per week, so with the introduction of the *"Princess Victoria,"* the total saving in coal on these L.M.S. routes is 1,060 tons per week.

British Cars at Geneva

It is good to learn that British cars were very prominent in the Geneva Motor Show in March, in which they led the way with a display of 24 makes. They made a splendid appearance, and their modern features attracted considerable attention. Special attractions of the display were *"Old Faithful,"* Field Marshal Montgomery's Humber staff car during his North African and Italian campaigns, and Lieut.-Col. A. T. Goldie Gardner's record-breaking M.G. British motor cycles too showed up well, and altogether the exhibition provided evidence of the progress made by the British motor industry.

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More About Air Inventions

By C. G. Grey

(Founder and Editor of "The Aeroplane," 1911-1939
Compiler and Editor of "All the World's Aircraft," 1915-1941)

SOME writers seem to think that tailless aircraft are a new invention. The truth is that the first tailless glider was flown by Mr. Dunne (the writer of "*An Experiment in Time*") in 1908, at Blair Atholl in Scotland; there are some very funny stories about it, and its guard of Atholl Highlanders. Two power-driven biplane versions of it were flying at Eastchurch in 1901-11. Young Richard Fairey, now Sir Richard, of the great Fairey Aviation Co. Ltd., had to do with it.

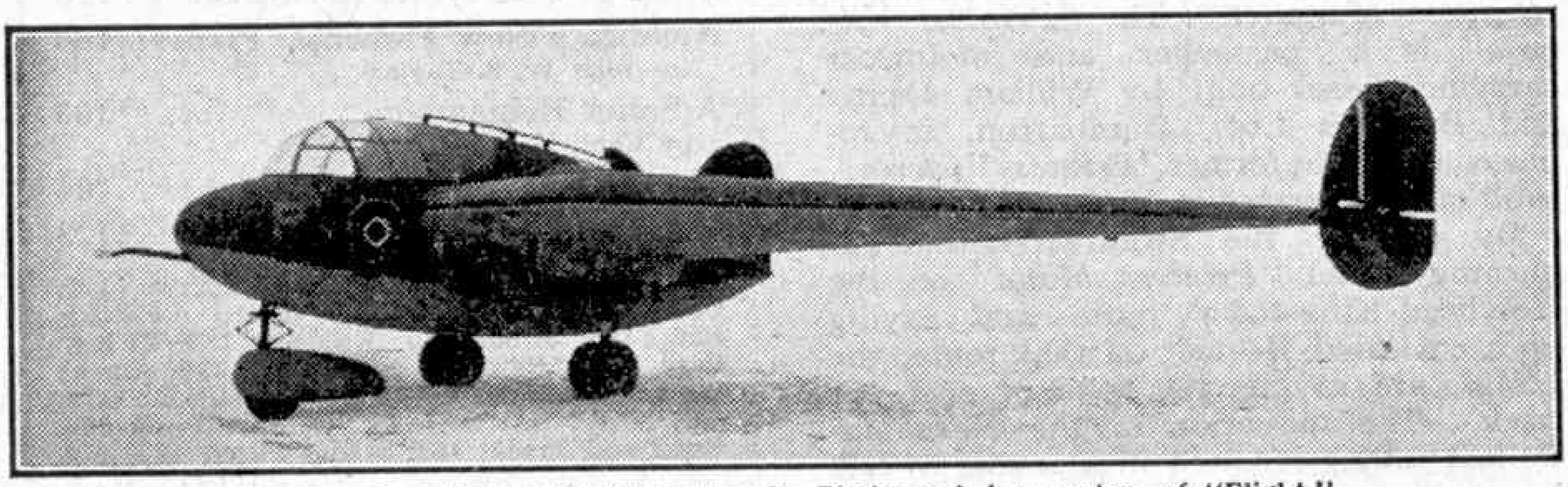
The tailless triangular teatrays of to-day, here and in the U.S.A.—and probably in France and Russia—are an attempt to prevent what the aerodynamic sharps call "shock-stall" at somewhere near the speed of sound. Have you ever noticed that when lines of sea-waves are coming at a beach parallel to it the breakers break with a terrific shock. But if they approach it at an angle, as on one side of a bay or a promontary, they seem to break quite gently along it, because the breakers break progressively. It is rather like trying to tear a pack of cards or thickness of paper, all at once, as compared with tearing them on a slope so that one starts by tearing only one and the rest follow in series.

Swept-back wings are also hailed as a new invention. George Handasyde of the late great Martinsyde firm used to say, in 1914 or so, that if you saw a machine with the wings swept back you knew that the designer didn't know where his centre of gravity was. There have been other reasons, such as field of fire for guns or a modification of an existing design to carry extra weight aft. But there is nothing new about them, and they are used to-day in aircraft with tails, and with jet engines, to ease shock-stalling.

One of the most amusing examples of a bogus invention was shown in a picture of a very ordinary twin-engined machine in the U.S.A. on to which the owners or makers had stuck a third engine, on the end of the nose, to help it to haul its load out of small aerodromes in foreign countries. It isn't even a new development. It is at least as old as 1925, and, I think, older. My dead friend Anthony Fokker made a passenger monoplane with high wings built of and covered with wood. They had an engine under or in (there were several types) each wing and a third in the nose.

Bill Stout of Detroit, U.S.A., built the Ford Trimotor, of corrugated duralumin, with three engines in the same way. The Junkers 52, still one of the best and safest aeroplanes in the world, has three engines. So good are they that British European Airways, who got a dozen or so for nothing from Germany, have thought well to spend between £6,000 and £10,000 apiece on dolling them up for use on our internal airlines.

The objection to them is that the big fuselage gets in the way of the air-stream from the airscrew on the nose and decreases efficiency. Another dead friend of mine, also a Dutchman, Frits Koolhoven, tried to get over that by mounting his third engine on a sort of trestle on top of the hull. But the trestle put up nearly as much resistance as did the hull behind the nose engine. Several other makers



Handley Page "Manx" tailless aircraft. Photograph by courtesy of "Flight."

Jet-propelled Lockheed P-80 "Shooting Star" with two "Jato" rocket-assist units attached to the underside of the fuselage makes a striking take-off. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

have used three engines, one way or another, during the past fifteen or twenty years.

Yet another brilliant invention, credited as usual to the U.S.A., is the notion of helping over-loaded aircraft off the ground, or helping normal loads out of a small airfield by fitting rockets under the wings or under the fuselage to give the machine a boost—for aircraft, when once in the air, will fly and climb with loads which they cannot lift off the ground. But there is nothing new in the rocket idea.

Probably the notion of using rockets for the propulsion of a man-controlled vehicle was started by young Herr von Opel of Wiesbaden, who tried rocket-propulsion in a car about 1930 or earlier. In any case the Luftwaffe used them in 1940-41.

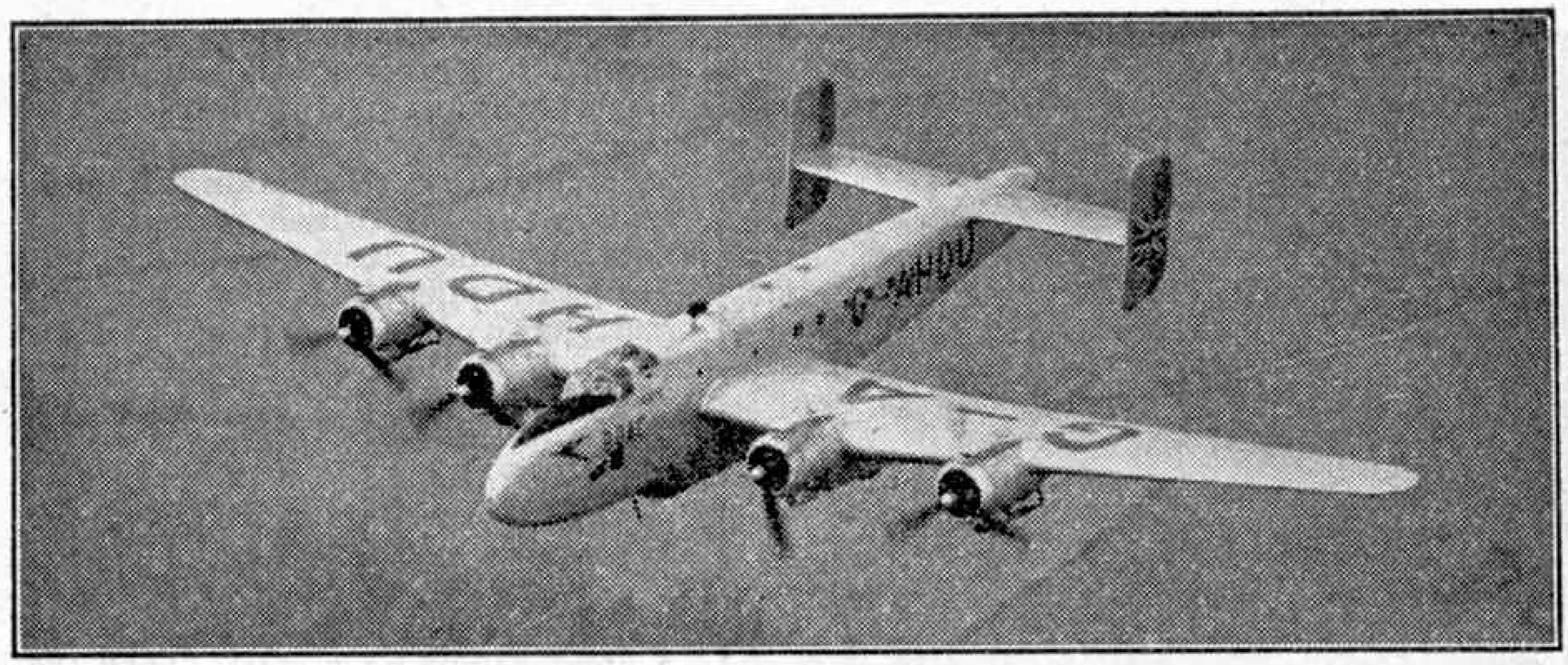
A Dutch friend of mine, Jan Plesman, son of the great chief of the K.L.M. (Royal Dutch Airlines) was imprisoned in Holland for a year before he escaped and joined the R.A.F.—only to be killed, poor lad, flying a fighter over Holland in 1944. He told me that he used to sit on the edge of a German aerodrome in Holland and watch their bombers take off at night, full to the bung with petrol and weighed down with bombs so that only rockets could push them off. An engine failure just after leaving the ground meant a certain crash, and a terrific blaze and explosion—some of which he saw. Even a safe take-off was a terrifying sight, according to him. But from the point of view of the crew it was not so much worse than taking off in a certain type of British twin-engined machine which, if one engine cut out during the take-off, as they often did, had a habit of swinging round towards the side of the dead engine, falling over onto that wing-tip, turning upside down, and burning everybody on board.

Late in the war, in 1944, the Luftwaffe had a few high-speed single-seat fighters which were driven solely by rockets. They went to a great height for a start. Then the pilot cut off his rocket's discharge and glided around looking for an Allied aircraft. If he saw one he switched on his rocket again and went after it at something well over 500 m.p.h. When he glided (or glid) too low he switched on, went up to the 30,000 ft. mark again, and started his gliding patrol afresh. How, or whether, they landed or baled out by parachute I do not know. The total duration of the rocket was less than ten minutes.

Anyhow the gentleman in the U.S.A. whose picture in a rocket-driven tailless machine has appeared so often, bearing the legend: "Is he the first rocket man?" can be answered simply by the phrase: "Not by a jugful."

Among the real inventions, or at any rate revolutionary developments as the result of research, I should put first the Handley Page Slot, which I first described in *"The Aeroplane"* in March 1920. There is no room to spare for a description of it here, but, to put it briefly it consists of a slat carried in front of the leading edge of each wing, of metal or wood, and itself shaped as a high-lift wing. Normally the slat lies tight against the wing and forms the leading edge.

When the wing is put at a big angle to the air, and is approaching stalling point (the position in which it ceases to lift), the slat moves forward and thus opens a slot between the wing and itself, which slot lets in a layer of air over the top of the wing, and restores its lift, so that the aircraft can land at a much lower speed and descend more slowly than it would with a normal wing. Thus the risk of a crack-up and burn-up is much decreased. Also the risk of stalling and "falling out of the pilot's hands," as



B.O.A.C. Handley Page "Halton" transport, a typical 4-engined all-metal aircraft of to-day. Photograph by courtesy of British Overseas Airways Corporation.

aviators say, is practically abolished.

Slotted wings saved many lives before the war. They were not used during the war because of the danger of one slot being shot up and refusing to open, while the other worked and turned the machine over. In peace-time they are not used because of the danger of icing-up, but they can be de-iced if designers will take a bit of trouble. Another objection, and I fear the most important, is that they weigh something, which means so much less pay-load.

All the same I think that we shall come back to them when potential passengers on airlines get tired of taking needless risks and insist on safety on the same scale as one has on a decent railway.

Another advance which we can claim is all-metal construction. So far back as 1920, Oswald Short, the youngest of the flying-boat Short Bros., then head of the firm, designed and built a biplane of which the fuselage (or hull), the wing-covering, and the undercarriage were wholly of aluminium alloy. The idea was copied soon after in the U.S.A. and all-metal aircraft are now universal, except in the small runabouts.

Incidentally, light aeroplanes, the forerunner of all small runabouts, were developed, though not invented, for there is no invention about them, in this country. A. V. Roe and Co. Ltd., and De Havilland Aircraft Ltd., made light aeroplanes in 1923/24.

There may be some argument about where retractable undercarriages originated. But I can certainly claim that George Dowty was making, and patenting, such mechanisms as soon as anybody else of whom I have had knowledge in nearly 40 years of aviation. But there is one thing which I think that we may claim as a positive invention, that is the Dowty Liquid-Compression Spring Gear, for undercarriages or anything else.

Engineers and students have always been told that liquids are incompressible, and we all believed it. In 1943 or so George Dowty discovered that he could compress liquids, if he could get up to something like 4,000 lb. to the inch pressure, and could keep his cylinder and pistons from bursting, and could keep the liquid (oil) from escaping. He did it, by strenuous experiment, research and development. And to-day several of our aircraft get their undercarriage springing from oil in compression.

To my amusement I heard, as lately as March, that our great National-Socialist airline Corporations are studying the development of a "Safety First" air liner, which is to combine the good qualities of the Handley Page 4-engined slotted biplanes and the Junkers 52 and the de Havillands of fifteen years ago. That *will* be an invention.

That I hope will give you some ideas on inventions and developments. One way to do well out of them is to look through old ideas in technical papers of years and years back, or old patent specifications, bring them up to date, and have them boosted as brilliant new inventions. The other, and less usual, is to find that there is a long-felt want for some gadget or other and then set about inventing it. Which is a strain on the brain and on the purse. But having a try at it is still worth while. You may after many years of hard work make a fortune almost as great as if you won a penny Football Pool.

The Glasgow Subway

By W. A. C. Smith

A VERY interesting British railway serving a large city is the Glasgow Corporation Underground. This is known locally as the "Subway," although since the reconstruction programme of more than 10 years ago all stations bear the legend "Underground" in large lettering. The line does good work and is popular, but it suffers from two great drawbacks. One is that the gauge is not standard, and the other that the area served is restricted. Unfortunately there is little that can be done about either of these.

The system is of 4 ft. gauge, and has very small circumference tunnels. It is laid out in the form of a rough circle and is about 6½ miles in length, with 15 stations. The crude circle was to suit cable operation, but if the line had not been constructed until a few years later electric traction could have been installed from the start. At the time of building there were unfavourable reports on this type of propulsion from various quarters, and the routes were not laid out in a series of diagonals with convenient changing stations, as should have been done.

St. Enoch's Square, showing the entrance to the St. Enoch's Station on the Glasgow Subway.

The line began its career as the Glasgow District Subway, with cable traction. The bill for its construction was passed by Parliament in 1890 and work commenced at St. Enoch's Square, in the centre of Glasgow, in 1891 with the driving of two tunnels northward to Buchanan Street and southward towards the River Clyde. At St. Enoch's sand and shale were encountered while wet mud and sand were met on the south side of the Clyde. On the north side mainly shale and sandstone were found, but trouble was given by liquid mud and coal waste at Partick. A great deal of solid rock had to be blasted, and the line runs under the River Kelvin once and the Clyde twice. Where they pass beneath the Clyde near St. Enoch's the tunnels are 41 ft. below the high water mark, and at Partick 56 ft. The gradient at the river crossings is 1 in 20.

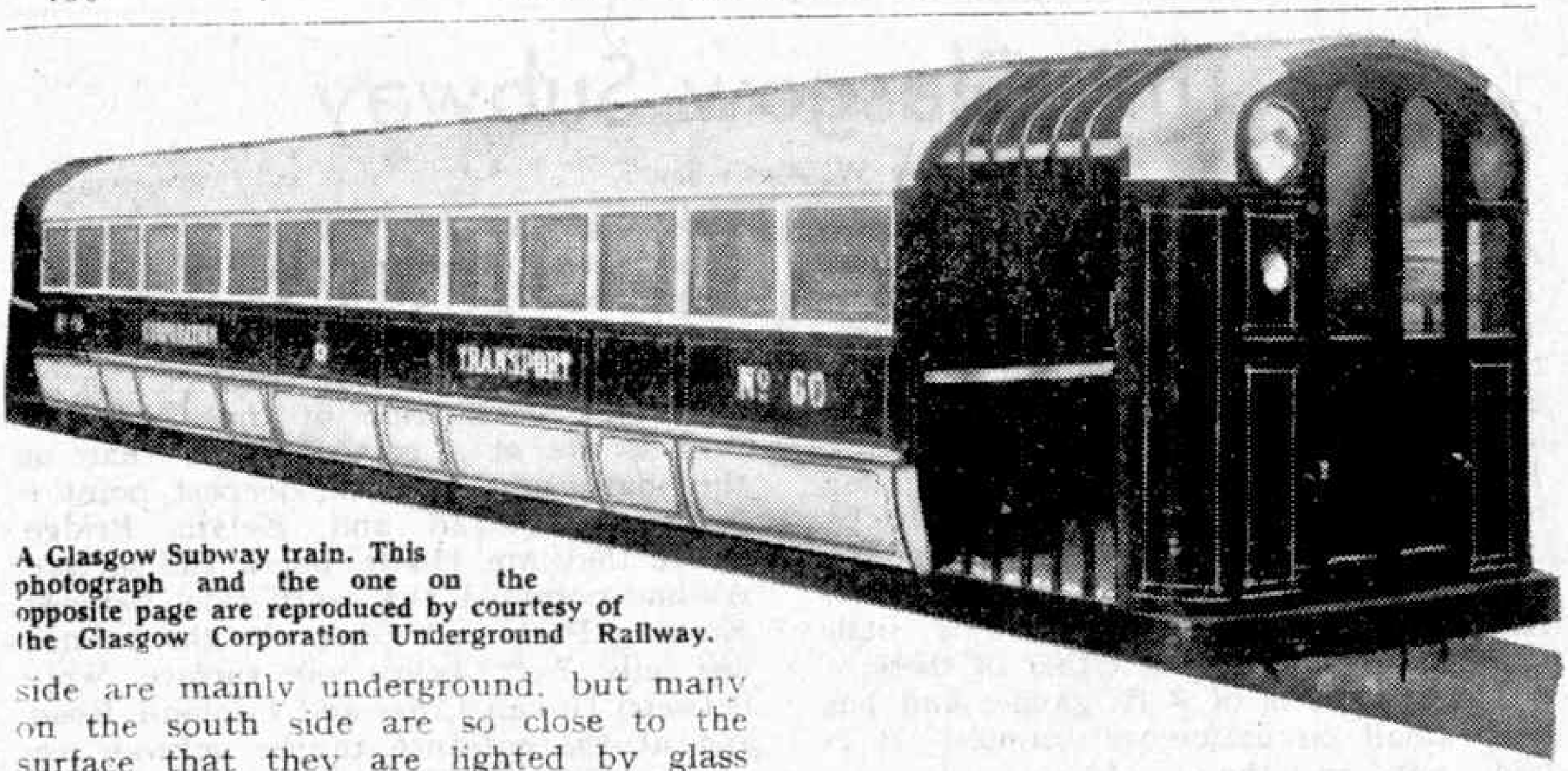
On the north side of the Clyde the tunnels are at a greater depth than on the south side, and the deepest point is between Hillhead and Kelvin Bridge, where they are 115 ft. below the surface. At one point on the south side, between Kinning Park and Cessnock, the tunnels are only 7 ft. below the surface, while between Govan Cross and Copland Road, and at the entrance to the subway car sheds, the tracks emerge from the tunnels and run through cuttings for a few yards.

The lines are in two separate tunnels and there has never been any physical connection between the Inner and Outer Circles. There are no points on the line, to obviate difficulties with the cable at these in cable-operated days, and when a car has to be taken to the sheds it is lifted off the track by a travelling crane. At night the 20 cars used on each circle are parked end to end in the tunnels under Govan.

The cables that originally hauled the cars were 1⅛ in. in diameter and 36,300 ft. in length. They were driven by a 1,500 h.p. motor in Scotland Street, and a second similar motor was kept as a spare. Speed was 12 m.p.h. and a train took 38 min. to make the circuit.

From the first the lighting of the cars was by electricity, the current being taken from conductors on the side of the tunnel away from the station island platforms. This method of lighting is still in use, the collector bows being mounted on the off side of each car.

All the 15 stations are of the single island platform type. Those on the north



A Glasgow Subway train. This photograph and the one on the opposite page are reproduced by courtesy of the Glasgow Corporation Underground Railway.

side are mainly underground, but many on the south side are so close to the surface that they are lighted by glass roofs. At each station there was a manually operated somersault signal similar to the old Great Northern Railway type.

Construction cost £1,500,000 and the subway came into operation on 14th December 1896, but had to be closed again for a short time, as 19 people were injured in the rush to travel. In the first six months of operation six million passengers were carried and £27,882 taken. For many years the subway was a source of amazement, and then of jokes, to visitors, and a constant irritation, tinged with amusement, to residents, as breakdowns were frequent. The dirty, damp whitewashed stations, and the semaphore signal worked by a man at the platform end, created an unforgettable impression.

Unfortunately the subway did not pay and, after heavy losses, it was closed on 25th March 1922. In August of the same year Glasgow Corporation Transport Department bought it for £381,589 and re-opened it for traffic. In 1935 it was converted to electric traction, the inner circle beginning electric working on 28th March and the outer circle in December.

The clearance is so restricted in the tunnels that the conductor rail is mounted about level with the car axles. Current is fed to it at 570 v. and comes through substations from Pinkston Tramway Power Station. Cars are wired for lighting from this supply, and should the separate lighting supply fail the lights will thus still function.

On electrification of the system the 60 lb. rails were replaced by 80 lb. ones and automatic colour light signalling was installed. The old coaches were retained, but were reconditioned and improved out of all recognition. They are bogie cars, always used in sets of two, and have a length of 40 ft. 9 in. and a body width of 7 ft. 6 in. There is a very slight clerestory roof, with narrow ventilators, and passengers enter and leave through power-operated folding iron gates at each end. Recently several coaches have appeared with sliding sheet metal doors in place of these gates. The wooden seats were removed; it was not possible to instal transverse seats on account of the width of the coach, so comfortable semi-bucket seats facing inwards, and covered in red or brown leather, were fitted. This allows a large number of standing passengers to be carried. The second coach in each train is always a smoking one.

The coach colours are red and cream, with grey roof, but the side that is never shown to the platform is painted dull red all over.

Because of the lack of space it was not easy to fit electric motors to the coaches, but two 60 h.p. tramway type motors were fitted to each bogie on the leading coach of a set. The second coach in each set is a trailer. The outer coaches have Westinghouse brakes and the usual "dead man's handle."

One of the trains is at present experimentally fitted with fluorescent lighting and this has caused favourable comment among passengers.

One locomotive is owned by the subway. This is No. 1, built in 1927 by Wingrove and Rogers and rebuilt by them in 1936. It is an 0–4–0 electric locomotive of the storage battery type, and is used for service work.

When the rolling stock was being improved a general policy of cleaning up

and improving stations was put into operation, and a number were rebuilt in modern style. All are of similar plan, with a single island platform and a stairway leading to the surface and ticket office. Over the platform is a glass fronted indicator which lights up, showing the appropriate stations, when a train is due.

It is possible to reach any station by boarding a train at either side of the platform, because of the circular layout, and a journey right round now takes under 24 minutes.

During the war the subway became very popular, and often at rush hours long queues were to be seen at stations. One reason for its popularity in wartime was that it was speedy and brightly lit, while surface transport operated in blackout conditions. One result was that for the financial year ending 31st May 1945 the subway made a surplus of £21,623, while trams and buses showed a loss. The maximum passenger fare on the line is as low as twopence.

Copland St. Station on the Glasgow Subway. Photograph by courtesy of the "Daily Record and Mail," Glasgow.

During an air raid on 18th September 1940 a bomb hit a bowling green near Merkland Street subway station. This bomb dug itself in and damaged the walls of the underground so that traffic was held up for many months. The service was resumed on 27th January 1941. On 24th May last year traffic on the outer circle had to be suspended for the day because of an inrush of sand and water into the tunnel near Shields Road station.

Besides fitting a train with fluorescent lighting the Corporation have now installed this type of illumination in Buchanan Street underground station, and if it meets with public approval this type of lighting may be introduced into the whole underground system.

During the recent fuel crisis electricity cuts have caused some dislocation of the subway service. As the separate electricity supply operating the signalling system was cut, the automatic signals went out of action and trains had to be run at caution. They were sent away from each station by telephone, this ensuring that the line between each station was clear.

Each train has a crew of two, driver and conductor, wearing the usual dark bottle green uniform with red piping of Glasgow Corporation Transport Dept. Safety precautions in addition to the usual "dead man's handle" include an emergency hand brake which can be operated by the conductor. A telephone is carried in the driving compartment and can quickly be connected should the train stop in a tunnel. In the event of passengers having to walk through the tunnels emergency lamps are stored beneath the seats and the live rail can be "killed" by connecting it to the other rail by a bar also carried under the seats.

For many years there has been talk of extending the system, but the cost of this would be prohibitive, as the very small circumference tunnels would need to be enlarged and it would be difficult to incorporate the present circle in a new scheme.

A more feasible solution of the transport problem in Glasgow is the linking up and electrification of the L.M.S. and L.N.E.R. steam operated low level railway lines in and around the city.

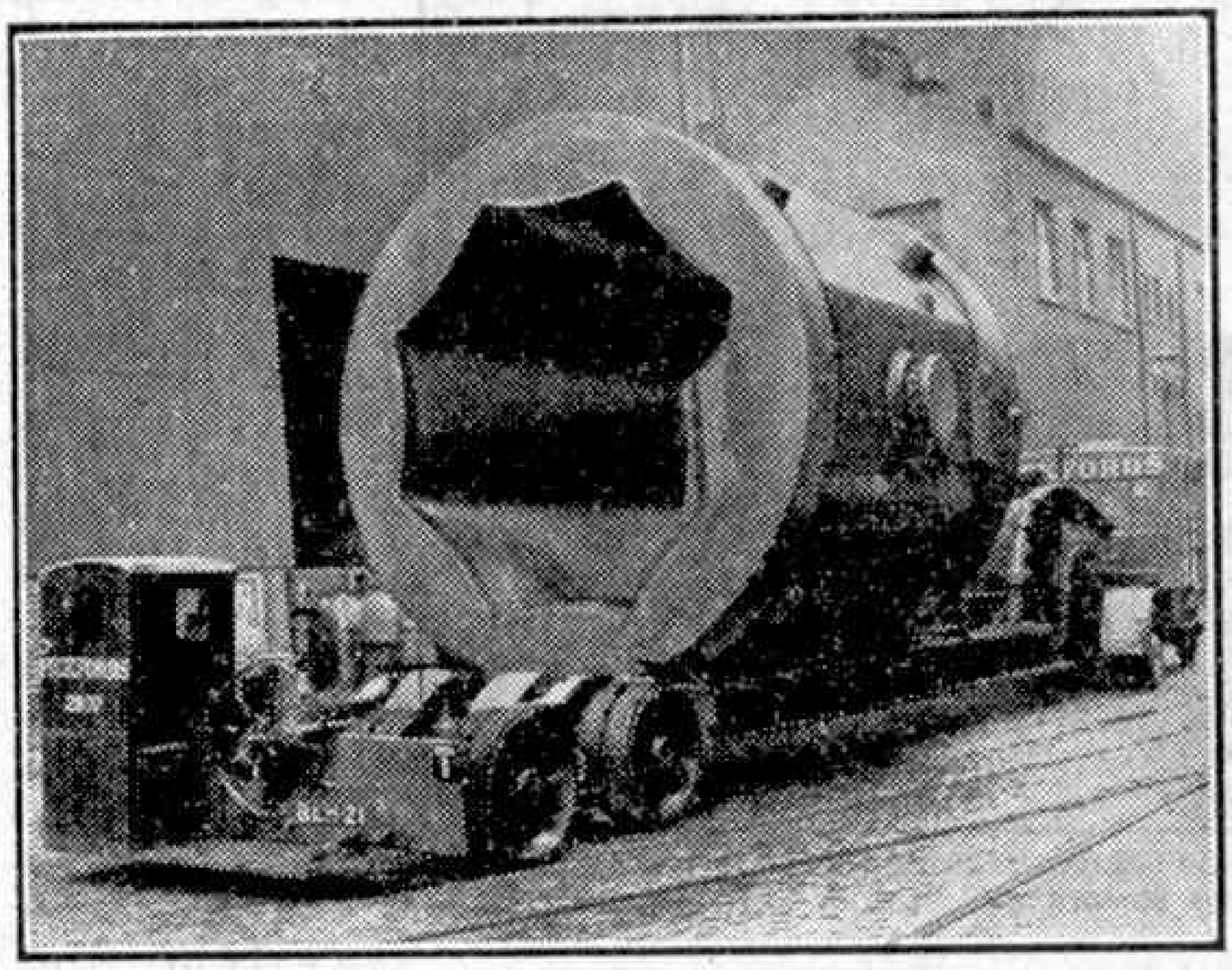
In the 50-year reconstruction plan of Glasgow published in April 1945 it is suggested that public transport be provided by single deck electric trams, which could be coupled up into trains to use a central reservation of the radial arterial roads and plunge underground in the central city area. Stations would be provided at half mile intervals. A model of city transport of the future displayed at the Glasgow Civic Exhibition "Glasgow Advancing" in the Autumn of 1944 showed streamlined single deck tramcars on a track of this kind.

Outsize Transport

By T. Holloway

DURING the past few years the transport by road of what are termed "abnormal indivisible loads" has become a highly specialised service, and some astonishing feats have been accomplished by the haulage contractors who undertake this class of work.

What constitutes an abnormal indivisible load? There are two ways in which a load may be abnormal—by weight, when it cannot be conveyed in a vehicle capable of carrying 14 or 15 tons; or by size, whether length, width or height. Subject to sanction by the Ministry of Transport, it is now practicable to transport loads having maximum overall dimensions of approximately 30 ft. in length, 12 ft. in width and 13 ft. in height, and a maximum weight of 160 tons.



The world's heaviest ingot mould, 13 ft. 4 in. long and of 12 ft. 9 in. diameter, on the road in Sheffield during transfer.

At first thought it may seem that such facilities should meet the requirements of manufacturers of heavy industrial plant. Until recently this may have been the case, but it now seems certain that industry will shortly come up against a grave problem. In order that our factories may work with the utmost efficiency, and answer the call for greatly increased output, the installation of larger and heavier plant is imperative.

Here is the crux of the problem. Scientists and technicians can produce the necessary plant, and the transport contractors can provide suitable vehicles with which to transport it to the customer; but our loads and bridges are unequal to the task.

The majority of the roads of England came into existence when this country was largely an agricultural one, and many are narrow and winding, and carried across streams and rivers by bridges that have remained unaltered for centuries. Our comparatively modern arterial roads were not designed to carry loads approaching 150 or 200 tons. Their primary purpose was to accommodate a large amount of normal traffic safely and speedily.

Even on the Great North Road, which is an A1 route, a bridge collapsed as an "abnormal" load passed over it. The reason was plain to see. This particular bridge was built in the 16th century, widened two centuries later and received little if any maintenance during the war years. Incidentally, the load which caused the collapse was not an excessively heavy one; it worked out at only 12 cwt. to each inch of bearing surface.

To complicate matters, there is the tendency for industry to move more and more into country areas, where road conditions are obviously less suited to heavy traffic than those of the existing industrial areas.

A detour of no less than 100 miles was necessary in order to convey a 125-ton stator from Stafford to Blackburn, owing to difficult bridges and road junctions.

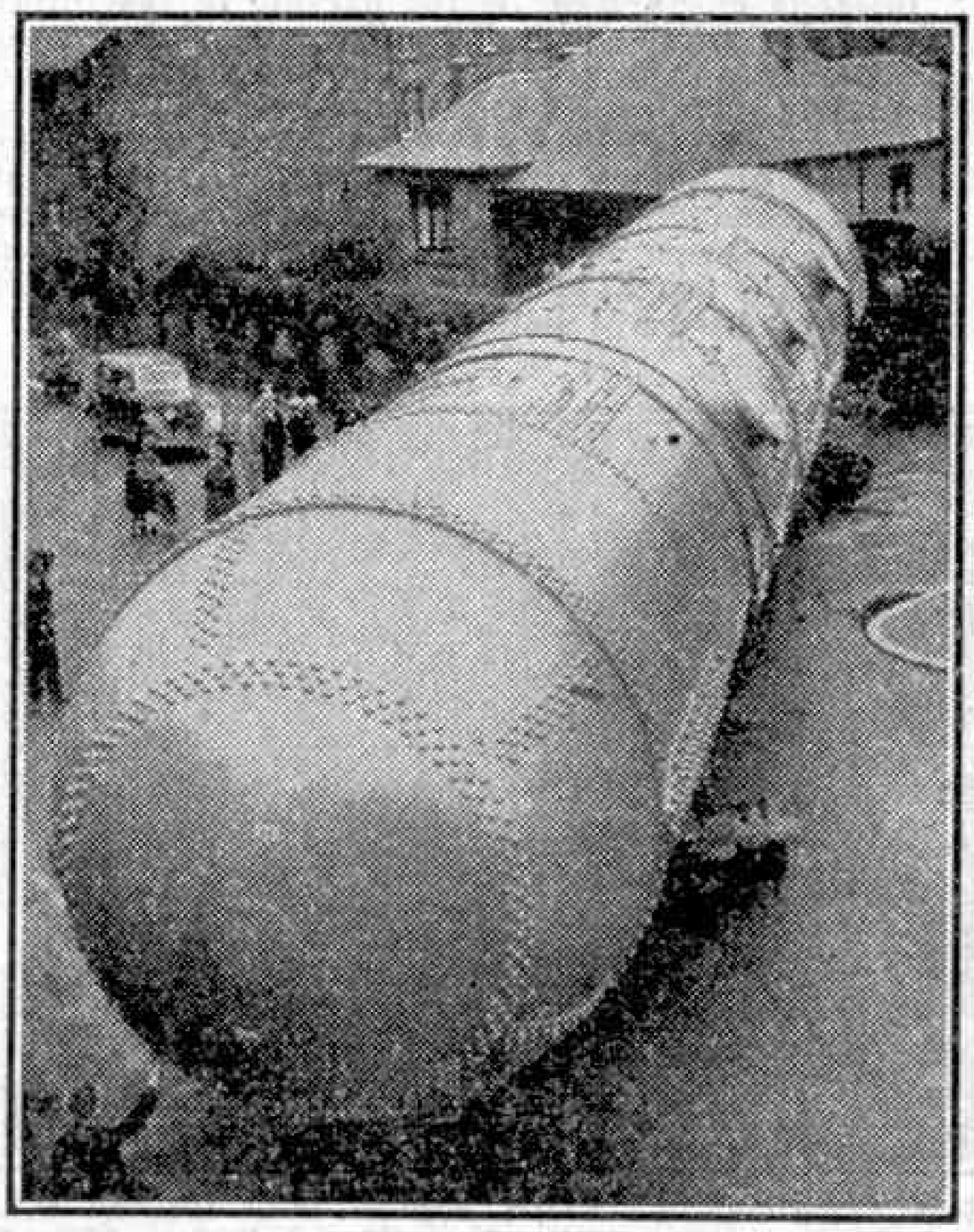
"Why not make use of rail transport?" you may ask. It is true that weight does not greatly trouble rail companies, but bulk does. Load gauge limits on our railways are much as they were a century ago. Tunnels, bridges and trackside apparatus provide obstacles which only the entire rebuilding of our rail systems can obviate. Actually there is even less clearance on some main lines to-day than there was say 30 years ago, owing to the installation of ground level signalling apparatus, additional island platforms, etc.

Roads have not kept abreast of engineering development and there is urgent need for the greatest co-operation among

This 90-ton stator was six days on the road from Witton to Hull. The illustrations to this article are reproduced by courtesy of Pickfords Ltd.

manufacturers, transport experts and Government departments if a "bottle-neck" is to be avoided in the not too distant future. For instance, the electrical industry is already planning production of individual items of equipment weighing over 200 tons. Owing to their complex design, and the necessity for factory testing at various stages of construction, it is not possible to convey these components in sections and to re-assemble them on the site.

Firms such as Pickford Ltd., who are specialists in "outsize" transport are often consulted about the conveyance of loads even before the blueprints of the proposed plant are complete. It is useless for a manufacturer to accept orders for plant unless it can be delivered to the customer when completed!



A steam accumulator that was taken by road from Glasgow to Annan.

The vast amount of preparatory work necessary before an "abnormal" load can start on its way is amazing. The transport firm must know the exact weight and dimensions of the load to be transported. Then, perhaps 12 or 18 months before the task is undertaken, a careful survey of the route is carried out. Even that does not suffice, for just before the convoy sets out a last-minute check-up is made over every inch of the route, as additional overhead cables may have been erected in the intervening period, or new road "islands" installed which would cause obstruction. Even the repair of a road surface beneath a bridge may reduce headroom and prevent the passage of the load.

Weak bridges have to be shored up and every bridge owner and local authority along the route has to be given at least two days' warning of the proposed undertaking, and also the necessary indemnity against damage. The police too must be notified and supplied with an advance time-table of the load's expected arrival in their particular area.

Some idea of transport feats accomplished may be appreciated from the following. A huge 90-ton steam accumulator was conveyed from Scotland to London at an average speed of 2 m.p.h. and the world's largest ingot mould, weighing 170 tons and measuring approximately 17 ft. by 13 ft., was taken across Sheffield without mishap. A notable wartime feat was the conveyance of a solid hammer-block weighing 120 tons.

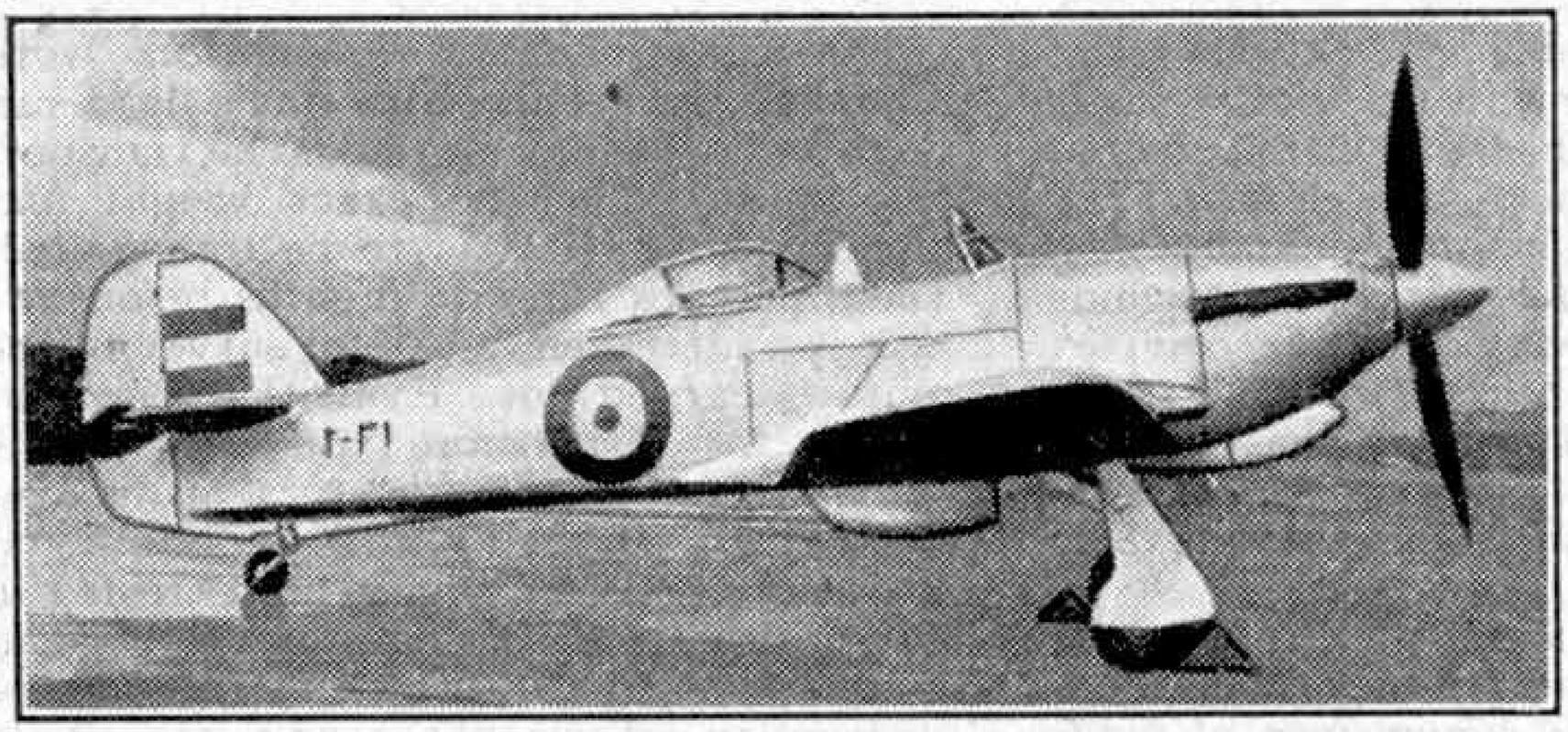
The latest type of carrying vehicle weighs 20 tons and has 16 wheels, each 15 in. wide. Fowler 10 m.p.h. traction engines are much used by Pickfords, as many as three being employed for hauling one load. A.E.C. 8-wheel dropped-frame carriers have also proved their worth. Scammel and Foden tractors fitted with Gardner oil engines have done great service, and so has the Holt caterpillar tractor in work "off the beaten track."

Air News

By John W. R. Taylor

Hawker Exports

In view of the wonderful service put in by Hawker "Hurricane," "Typhoon" and "Tempest" fighters during the recent war, it is hardly surprising that Hawker aeroplanes are now in demand by several foreign air forces. In the November 1946 "*Air News*" I referred to the 34 "Hurricanes" ordered by Iran.



Hawker "Hurricane" two-seater trainer with enclosed cockpit, a version supplied to Iran. Photograph by courtesy of Hawker Aircraft Ltd.

The latest photograph of the two-seat version is reproduced on this page, and shows that the rear cockpit has now been fitted with a Perspex hood. These Iranian "Hurricanes" have now been re-assembled in Iran after shipment, and are proving very popular.

Hawkers have also sold 34 "Fury" fighters to the Iraqi Government, of which four will be two-seaters for training purposes. The single-seater version will be known as the "Fury Baghdad" and is similar to the well-known "Sea Fury" X except that it will not have folding wings and a deck arrester-hook. A contract for a number of "Sea Furies" has been placed by the Netherlands Government, and delivery will start this Spring. Other "Sea Furies" are going into service with the Royal Canadian Navy.

First American Jet Bomber

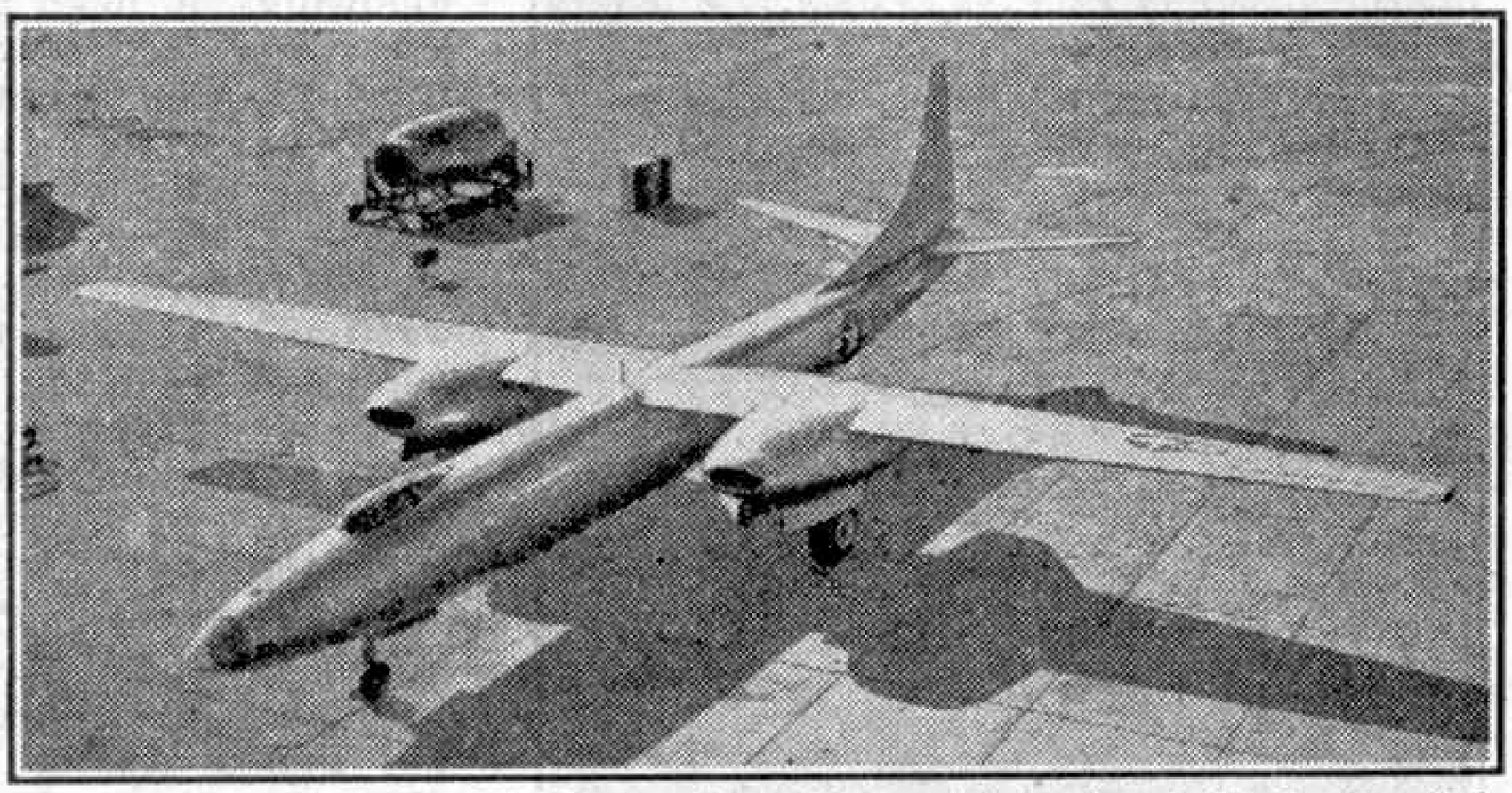
The New Consolidated Vultee XB-46, shown in the lower photograph on this page, is the forerunner of a new generation of heavy bombers. The advent of jet propulsion and the atom bomb automatically made obsolete all the old ideas on bomber design, so much so that even to-day designers cannot foretell if there is any future for bombers and fighters as we know them. Whatever the final outcome, there is undoubtedly a place in every air force for a bomber like the XB-46, and it is so aerodynamically "clean" and well-proportioned that it is almost impossible to believe that it has a wing span 10 ft. greater than that of the Avro "Lancaster."

From its beautifully streamlined Plexiglass nose to its square-cut tail it incorporates all the latest ideas in high-speed orthodox design. Its wing has a thin "laminar flow" section and, like the tail unit, a very high aspect ratio. The four General Electric jet engines are mounted in two underslung nacelles which also house the main wheels of the tricycle undercarriage when retracted. This must surely be about the neatest 4-engine installation ever conceived. At the moment the only projections on the smooth thin fuselage are the blister cockpit hood and an aerial. But, knowing the persistency of the "Christmas-tree" experts, it seems hardly likely that the XB-46 will get far on its service career before assorted gun turrets, radar aerials, etc., are added, although it is possible that its speed will make a heavy defensive armament unnecessary. It has been under development in Convair's San Diego factory for two years, and should have made its first test flight by the time these notes are printed.

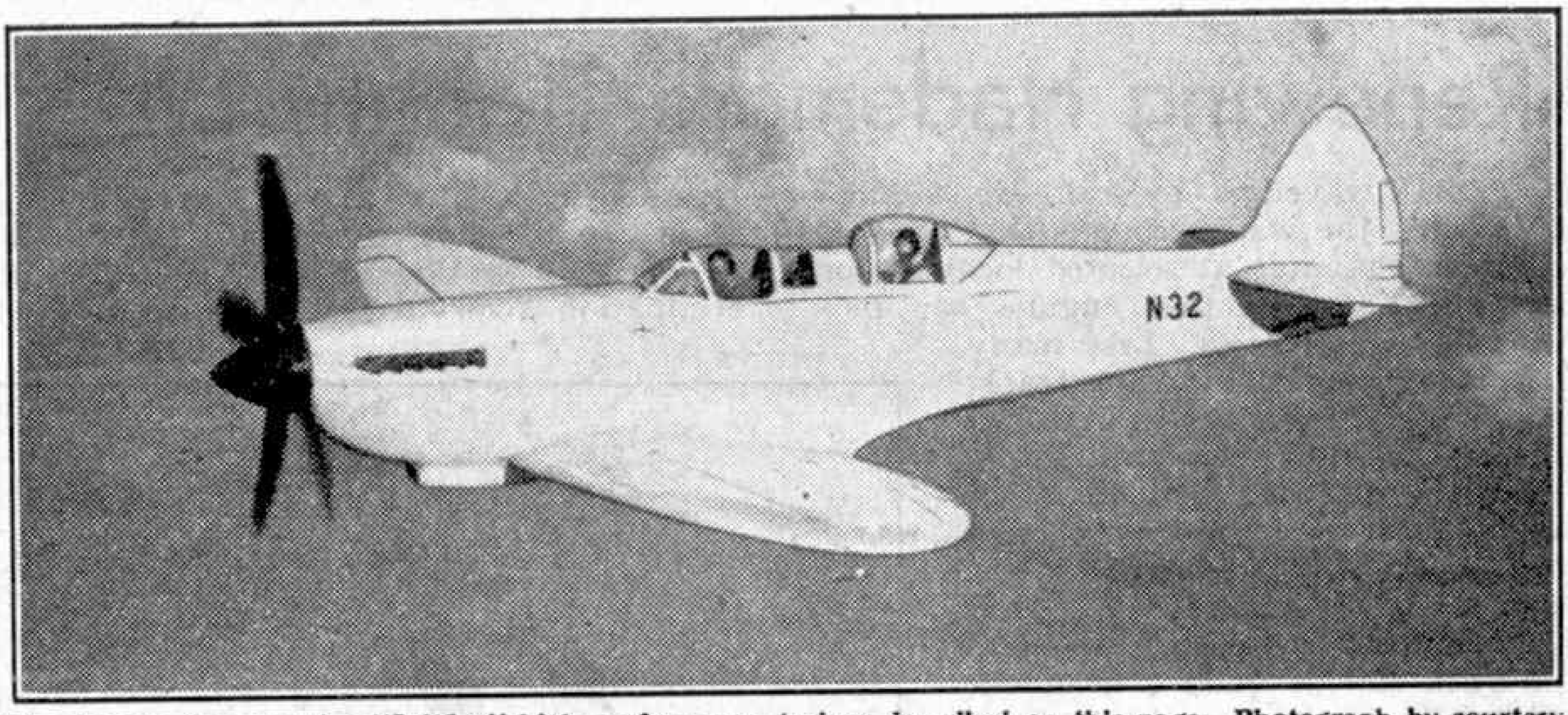
"Tudor" News

Production of Avro "Tudor" aircraft for Britain's Atlantic and Empire air routes is well under way, and already 13 of the "Tudor" I transatlantic passenger transports have flown. Of these, two are in the hands of the Development Flight of British Overseas Airways; three others, including "*Elizabeth of England*," which was named by Princess Elizabeth at the London Airport on 21st January last, are ready for delivery. "*Elizabeth of England*" is the flagship of the future BOAC fleet of 20 "Tudor" Is. Two other "Tudor" Is are being built for the use of Cabinet ministers, and will have state rooms and lounges.

The first two of the 79 "Tudor" IIs ordered by the Ministry of Supply are undergoing their final test flights. Production is in full swing and one of these aircraft is being fitted with "Hercules" engines in place of the usual "Merlins" to test the suitability of this alternative installation.



The Consolidated Vultee XB-46 experimental four-jet bomber built for the U.S. Army Air Forces. Photograph by courtesy of the Consolidated Vultee Aircraft Corporation, U.S.A.



The Vickers Supermarine "Spitfire" high performance trainer described on this page. Photograph by courtesy of Vickers-Armstrongs Ltd.

A New "Spitfire"

The first "Spitfire" flew on 6th March 1936, and in the 11 years that have elapsed since then it has become the most famous aeroplane in the world. Pilots of every Allied Air Force grew to love this beautiful but deadly little fighter with the "pointed wings," although there could have been few who expected it to remain in service in these days of jet propulsion. But the "Spitfire" is by no means obsolete yet, and Vickers have released details of a brand-new version, the two-seat "Spitfire" trainer intended for the final advanced training of fighter pilots. In fact its speed of 390 m.p.h. makes it quite suitable even for training pilots destined for jet fighter squadrons.

The prototype, shown above, was converted from a standard "Spitfire" Mk. VIII fighter, but conversion can be made to order from any Mark to the customer's own requirements. Naturally, it retains all the best and proved features of the fighter, including the latter's fine controllability and performance. Both cockpits have comprehensive controls and equipment, and have sliding jettisonable hoods; the instructor's seat at the rear is slightly raised to give an unobstructed forward view. Complete training is catered for, including gunnery and bombing; radio and oxygen installations are standard on all Marks, and a drop tank can be carried for long-range flights. And yet, fully loaded, this remarkable little aircraft weighs only 3¼ tons.

Convair 240s for Australia

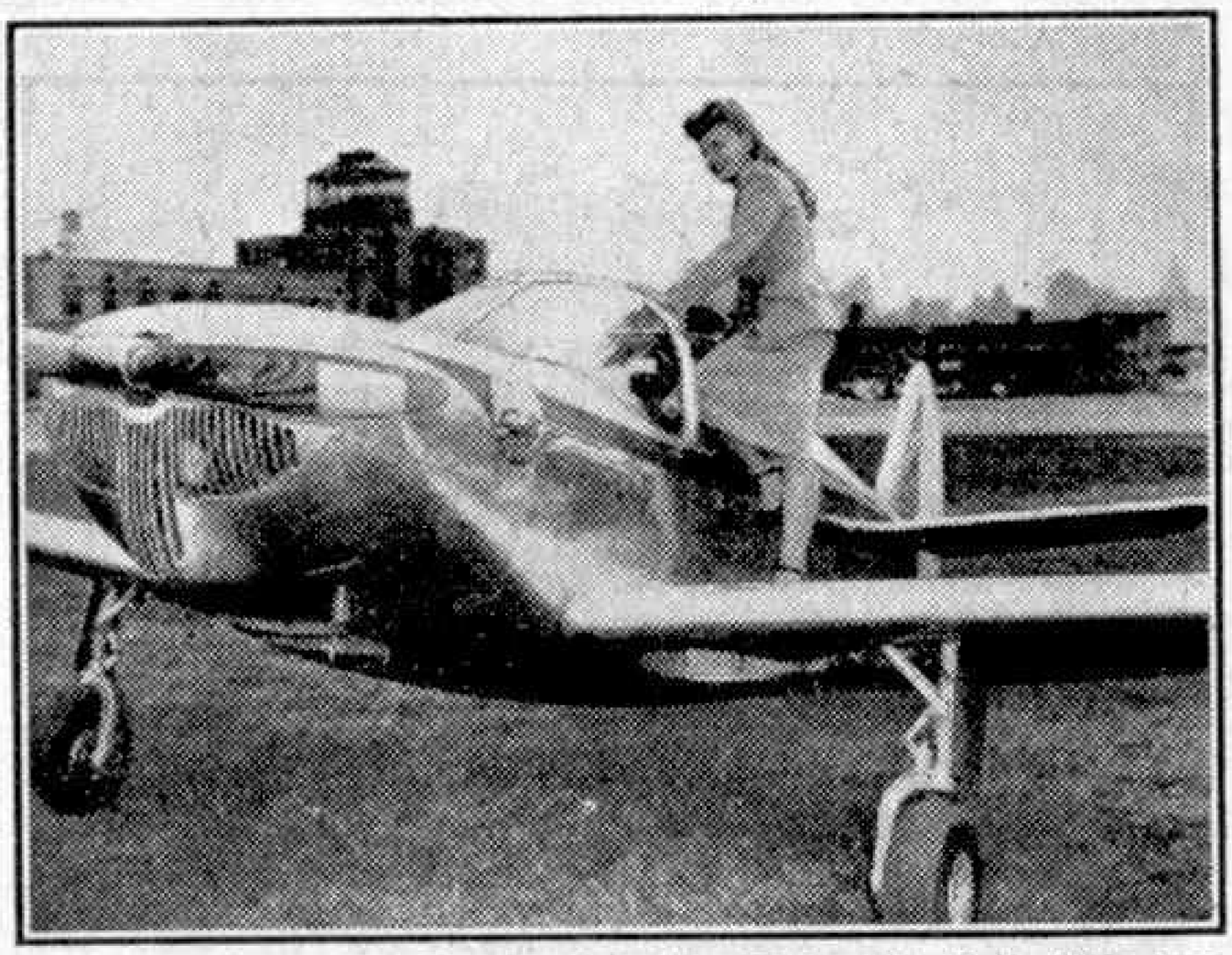
Trans-Australia Airlines have ordered five twin-engined Convair 240 air liners from the Consolidated Vultee Aircraft Corporation, U.S.A. The new machines will be used on interstate routes in the Commonwealth, principally between Canberra, Sydney, Melbourne, Brisbane, Adelaide, Hobart and Perth. Delivery is expected to begin next August.

The 240 is a 40-passenger aircraft powered by two 2,400 h.p. Pratt and Whitney engines driving reversible-pitch propellers. An interesting feature is that it is the first transport to utilise the exhaust jet-thrust from its engines to give added speed, and it will cruise for ranges of up to 1,200 miles at 300 m.p.h. Its soundproofed cabin is fully pressurised and air conditioned, and other features include radiant wall-heating and thermal anti-icing. It has a tricycle undercarriage, and a built-in stairway to the passenger cabin. The prototype flew for the first time in July 1946, and has proved so successful that orders have already been received for more than 150 production machines.

The Short "Bermuda" Flying Boat

Short and Harlands of Belfast are building three new "Bermuda" class flying boats for BOAC, to replace the three American Boeing boats that have put in such good service on the Corporation's Baltimore-Bermuda route. The new aircraft are basically Short "Sandringham" VIIs, but have been renamed as they are being specially equipped for the Bermuda service. They differ from the 21 "Hythe" class boats described in the March "*M.M.*" in that they will have a streamlined nose and tail instead of faired-over gun positions.

The "Bermuda" will have an all-up weight of nearly 27 tons and a cruising speed of 180 m.p.h., and will seat 30 passengers. It will have upper and lower decks and an attractive bar. The Boeing boats at present operate a thrice-weekly service in each direction on the 820 miles route, but when the new machines go into operation in the Autumn it is hoped to increase the frequency to a daily round trip.



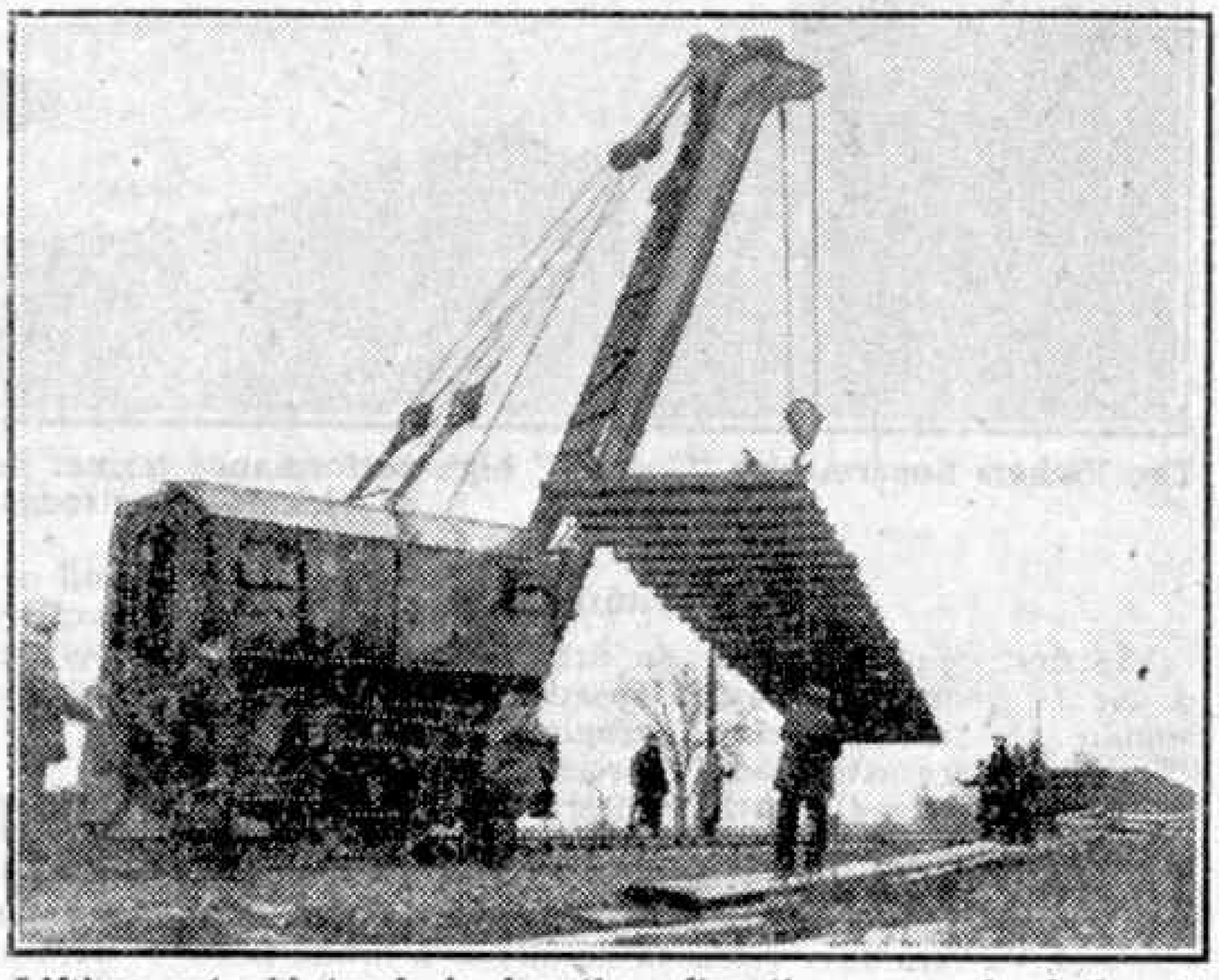
Demonstrating ease of entry into the Globe "Swift." This two-seater aircraft is to be built in England by Messrs. Helliwells of Stratford-on-Avon. (See special article on page 160.)

Renewing Hademore Troughs L.M.S.

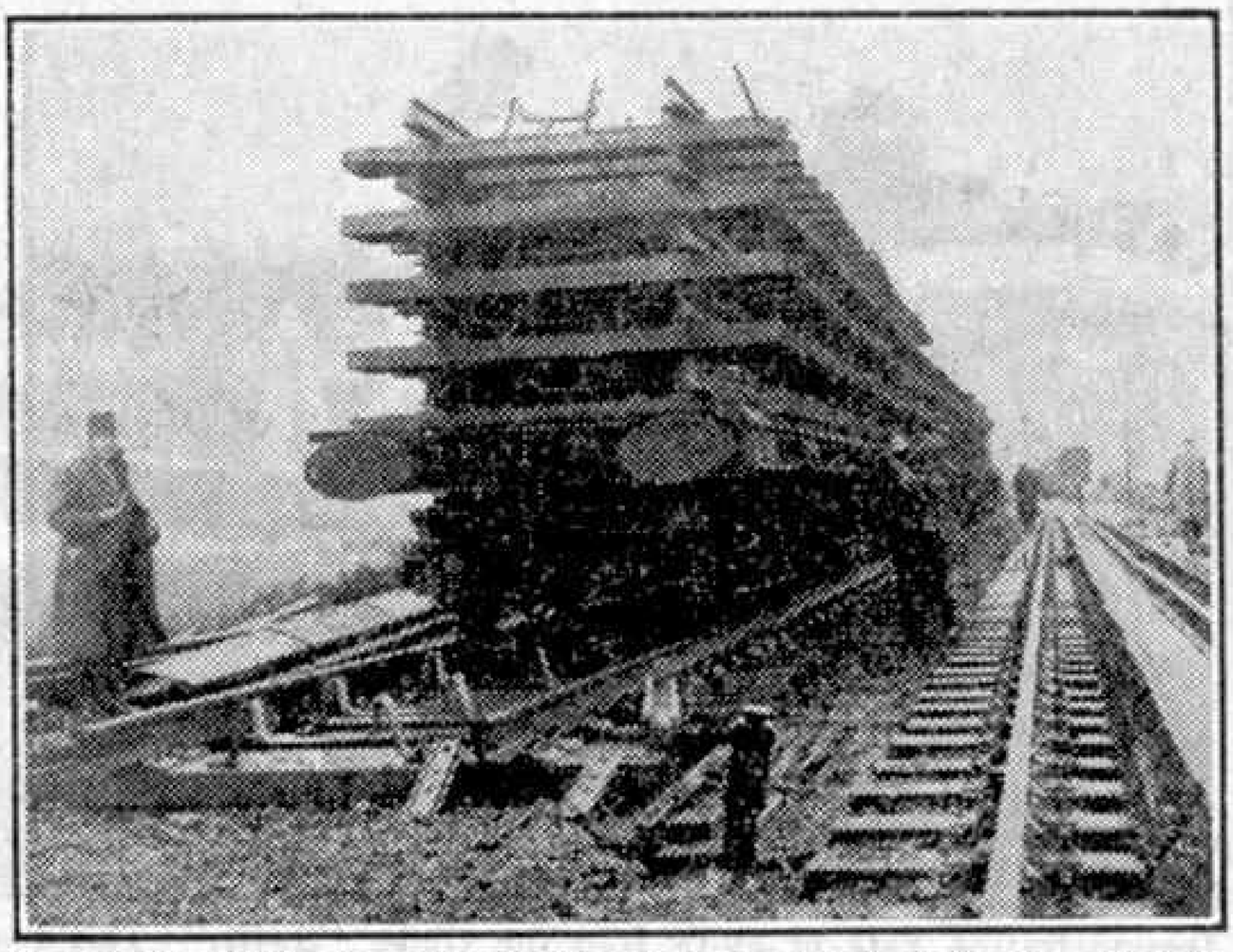
MOST travellers by rail are familiar with the water troughs that are laid between the rails at selected locations on various routes so that engines can pick up water on the run. Like many other things, including the track, water troughs are apt to be taken for granted, but their installation, maintenance and periodical renewal form an important part of the work for which the Chief Engineer is responsible.

Complete renewal of a length of track can be quite a headache especially on heavily-occupied sections. Hence this work is usually tackled on Sundays when traffic is less frequent. Modern methods, admirably described by "*Shed Superintendent*" in his article "*Track laying, Hornby style!*" in the August 1946 "*Meccano Magazine*," get the job done in the shortest possible time. When water troughs as well as the track have to be renewed, the difficulties are increased and very complete organisation of the work is essential.

It recently became necessary to carry out the double job at Hademore Troughs on the L.M.S. These are situated between Tamworth and Lichfield on the Trent Valley section of the Western Division main line from Euston to Crewe, at a distance of 114 miles from London. The troughs are located at the foot of falling gradients in each direction. As this is a two-track section of line the degree of occupation is very heavy, for it is traversed by a large number of express trains daily. These factors, in conjunction with the softness of the ground formation in the vicinity, have caused some difficulties in the past in the maintenance of the water troughs and tracks due to the quantity of water lost not only by spillage but also by leakage from the joints of the troughs.



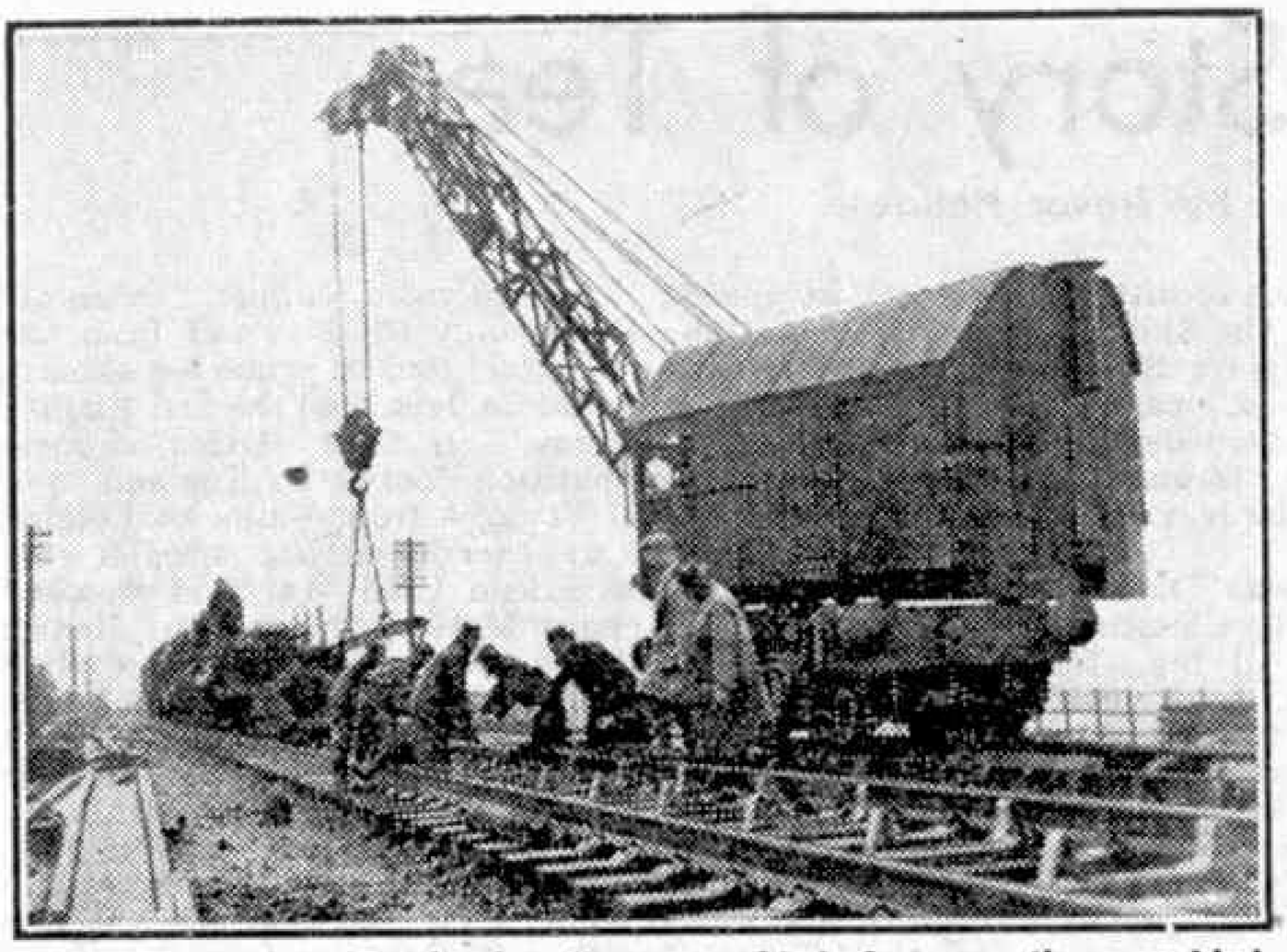
Lifting out old track in lengths after the removal of the old water troughs. The photographs to this article are by the courtesy of the L.M.S.



A wagon load of new track pre-assembled with the trough supporting brackets already in place.

In the renewal, therefore, opportunity was taken by the L.M.S. to employ the welding of the new troughs themselves into long lengths, in conjunction with the latest practice of laying pre-assembled track by the one-crane and two-crane methods. Welding of the troughs was used to minimise loss of water from the renewed troughs and thus improve the state of the formation for the future.

The method employed for pre-welding and relaying the water troughs is considered to be unique. In the past the usual practice has been to lay the troughs themselves in sections of 10 ft., and to bolt or rivet the sections together after laying. This method unavoidably exposes the joints



Laying new troughs in lengths assembled from sections welded together. Note the special lifting tackle developed for the job.

to stress, and consequently to risk of leakage. So the actual trough units were manufactured in the normal 10 ft. sections, but were welded into 60 ft. lengths at a permanent way depot, special rotating jigs being utilised to allow the sections to be turned in order to facilitate arc welding of all parts of the joints.

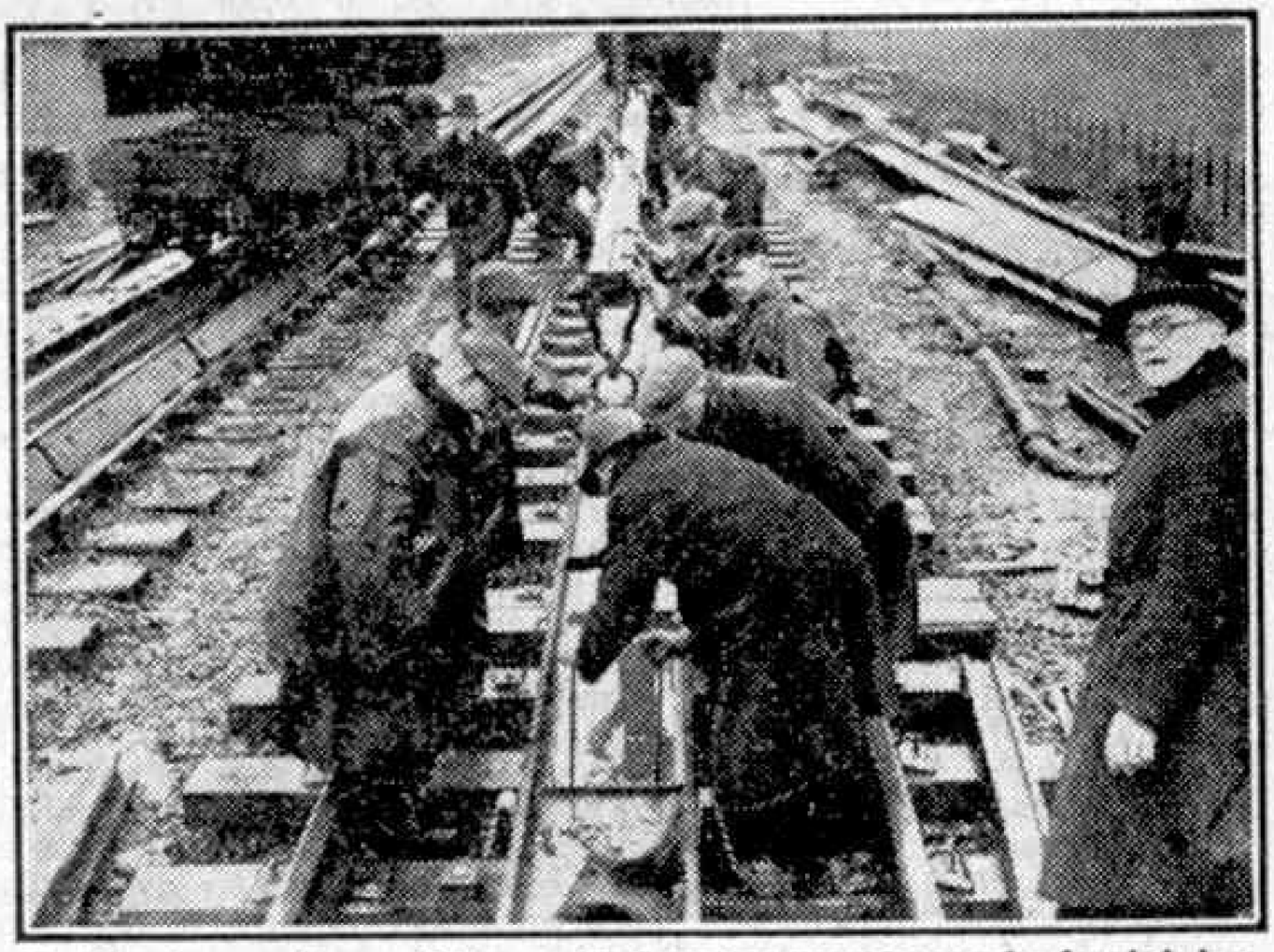
The total length of each set of troughs is 600 yards, and by welding the troughs into 60 ft. lengths the number of bolted joints to be maintained in future has been reduced considerably, in addition to improving the simplicity and speed of laying them.

The 60 ft. welded sections were then loaded on to bogie rail wagons for conveyance to the working site in company with other vehicles carrying the actual pre-fabricated permanent way and stone for ballasting the track. The marshalling of these trains required considerable care to ensure that the respective materials were available for laying by crane, in the exact sequence required.

The track to be relaid, including that portion on which the water troughs are situated, amounted to 720 yards on the down line and 740 yards on the up. The whole of this track had been pre-assembled at a depot in 60 ft. lengths for laying by crane. The new track itself is made up of 113 lb. flat-bottomed rail having cast iron baseplates, with elastic rail spike fastening. It has 26 sleepers per 60 ft. rail length, a ratio which is peculiar to track laid under water troughs, or in tunnels. The elastic rail spikes have been specially treated to retard corrosion. The troughs have also been treated with an anti-algæ paint.

The renewal involved complete occupation of both running lines on each of two successive Sundays. During each of these two stages, the material trains stood on the track being renewed, with the vehicles marshalled according to requirements, at either end of the section being relaid. For the initial one-third of the task, the two-crane method was used, until the water feeder-points to the troughs were reached; at this stage the one-crane method was adopted, the second crane then being used to lift the welded sections of water troughs off their wagons, and bring them along for installation on the new track as soon as this was laid. Special lifting tackle was designed for lifting the trough sections off the rail wagons, and another unusual feature was the provision of timber baulks to protect, when loading on rail wagons, the trough-supporting-brackets which had already been fitted.

On completion of relaying, the track was ballasted throughout with a 4 in. thickness of new ballast, and Hademore Troughs were ready once more to supply water to thirsty engines.



Positioning sections of the welded water-troughs ready for joining up. It always rains on these occasions!

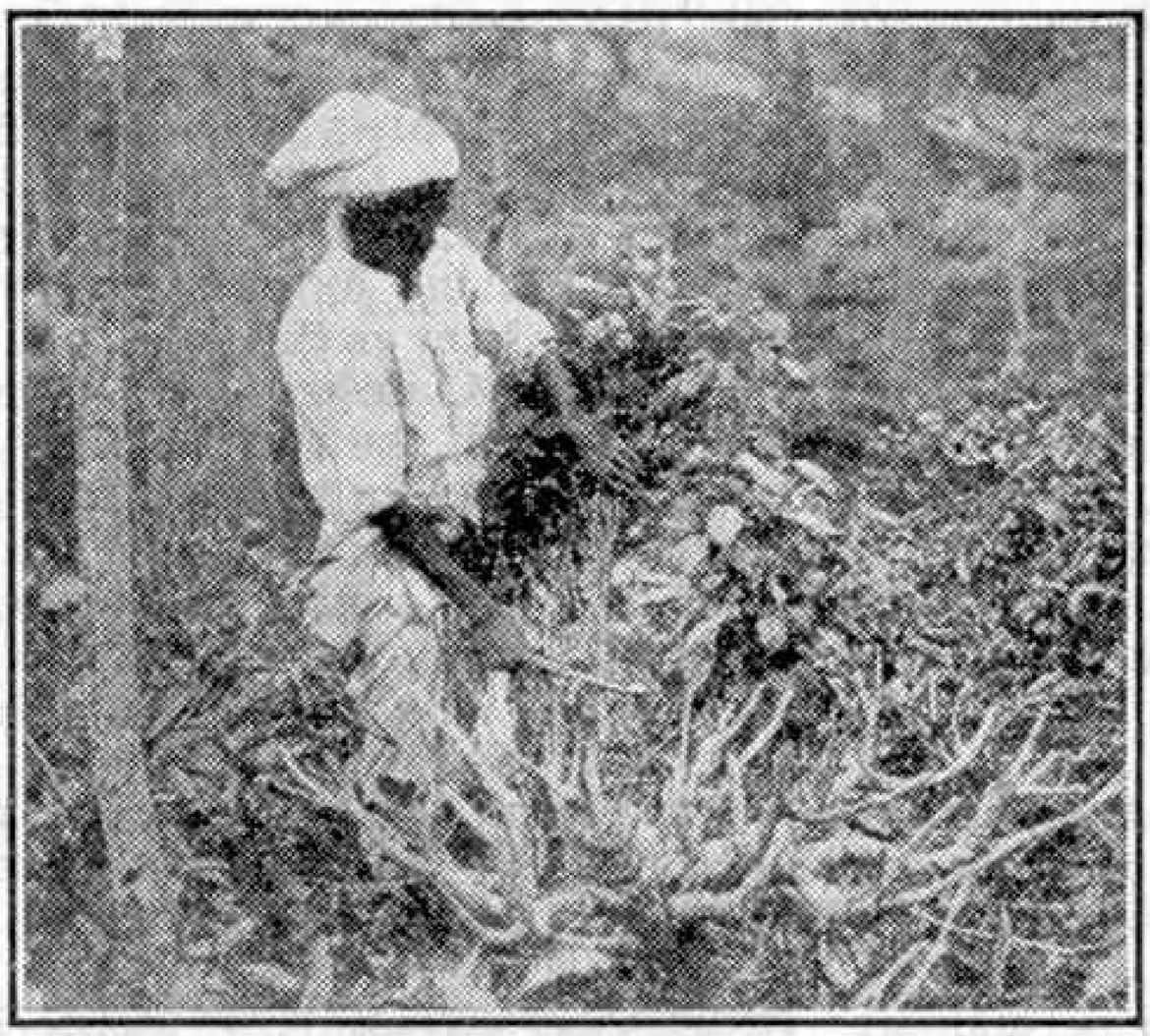
The Story of Tea

By Trevor Holloway

THE origin of tea is a subject around which countless tales and legends have been built up. The Chinese proudly claim that in 2737 B.C. the Emperor Shen-Nung, who religiously observed the hygienic practice of boiling his drinking water, noticed that some leaves had fallen into his pot of boiling water, imparting to it a delicate and exquisite aroma. The leaves of course, were those of the tea plant.

Indians, however, maintain that it was Darma, a devout Buddhist who lived in the early Christian era, who first appreciated the qualities of tea. It is said that Darma had undertaken a seven-year sleepless contemplation of the Buddha. In the fifth year of his self-imposed task he was almost overcome by drowsiness, when he chanced to pluck and chew a few leaves from a nearby bush. His drowsiness vanished, and by constantly repeating the process he was enabled to complete the remaining period of his vigil.

So much for legendry. Now we will consider the facts. It has been amply proved that the habit of tea drinking was first practised by the Chinese and is mentioned in the writings of Kuo P'o of a date equivalent to the fourth century of our own calendar. By the end of the eighth century the cultivation of tea had become an important industry.



Pruning a tea bush. The illustrations to this article are reproduced by courtesy of the Empire Tea Bureau.

About the year A.D. 816, a Buddhist saint introduced the plant into Japan and five provinces were ordered to cultivate it.

The first consignment of tea to reach Europe is thought to have arrived in Holland by way of Java in the year 1610. It soon became extremely popular, although in England it did not at first arouse much enthusiasm as a beverage, being regarded more as a medicine.

In 1657, Thomas Garaway, a London coffee-house proprietor, published the following announcement: "Physitians approved China Drink, called by the Chineans Tcha, by other nations Tay, aiias tee, is sold at the Sultaness Head, a cophee-house in Sweetings Rents, by the Royal Exchange, London."

Prior to that time the price of tea had been anything up to £10 per pound, but by the end of the 17th century the price had fallen to 12/- or 13/- per pound.

Tea smuggling soon became rife, particularly along the coasts of Cornwall, Dorset and Kent, use being made of numerous caves, underground tunnels and passages. Contraband in the form of tea, tobacco and silk was often stored in the crypts of West Country churches, for even the clergy and members of the Board of Trade were known to be engaged in "Black Market" operations!

In 1833 Parliament ended the East India Company's monopoly of the China trade. This ultimately resulted in intense rivalry between British and American dealers. American shipbuilders evolved their famous tea clippers, which greatly outclassed our own sailing vessels in speed. The American clipper "*Oriental*" made West India Docks only 97 days out from the Canton river with over 1,000 tons of prime tea aboard.

Jardine, Matheson and Co. launched the first English clipper, the "*Stornoway*," in 1849. Other clippers followed, and competition between England and America intensified. Voyages from China to London were accomplished at ever-increasing speeds.

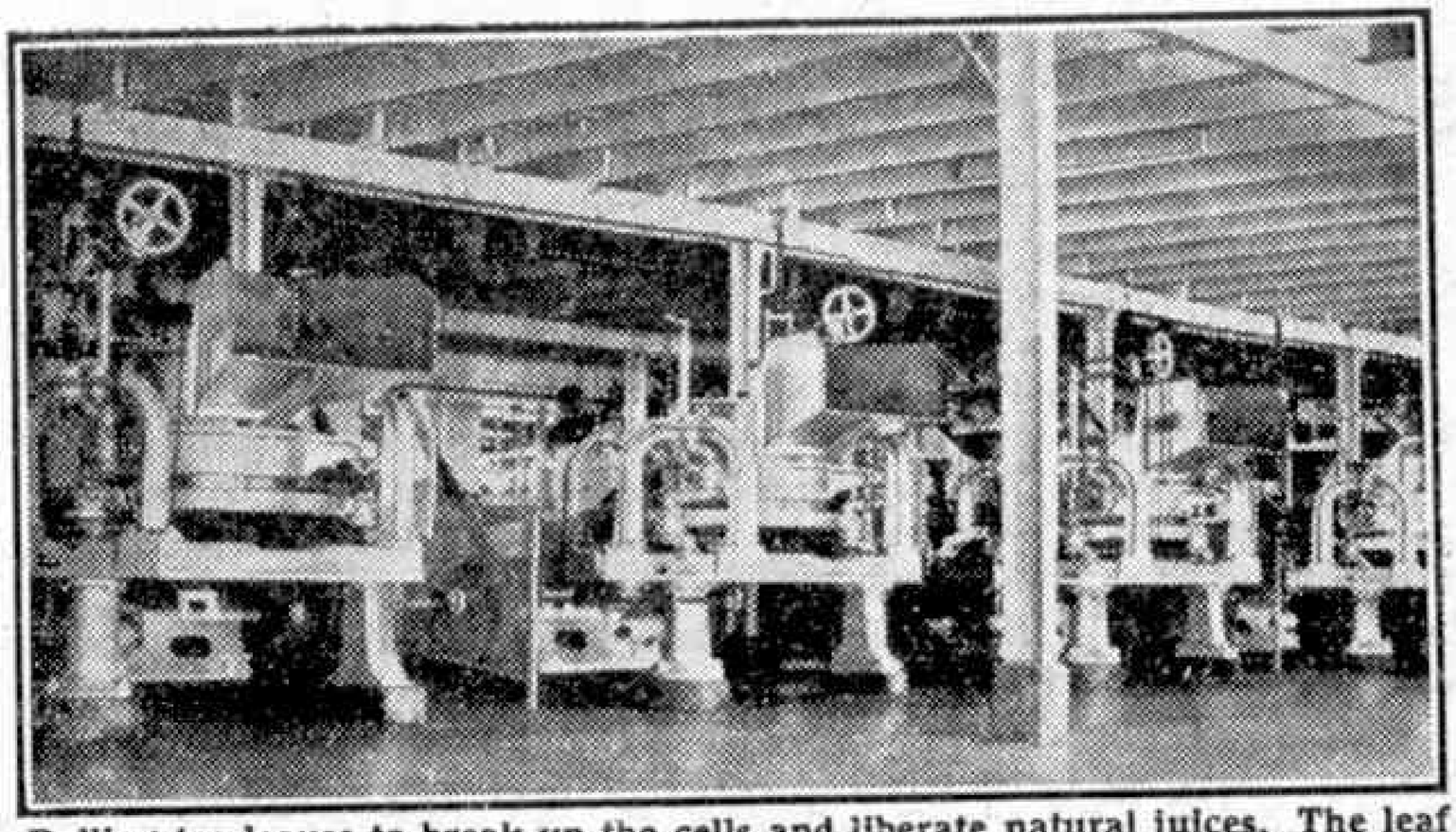
Even after the American Civil War had wrecked the American Merchant Marine, the various British shippers still waged the tea race among themselves and public excitement ran high, special look-outs being appointed to watch for the arrival of the first ship in the Channel. In 1866 the "*Taeping*" and the "*Ariel*" actually arrived at the Downs within 10 minutes of each other. Bonus at the rate of 10/- a ton was awarded as prize money to the officers and crew of first vessel home. The last tea race was won by the "*Titania*" with a 97-day run from Foochow. The advent of steam, however, spelt the death-knell to the days of sail.

The tea plant *Thea Sinensia*, is grown as a bush, but if allowed to develop it would grow into a tree some 40 ft. or 50 ft. high. Tea is manufactured from the young fresh leaves of the plant, and there are three main commercial types, black, green and Oolong. The differences are mainly the result of manufacturing processes and not the particular type of plant. Black tea, most commonly used in this country, is the fully fermented leaf obtained chiefly from India Ceylon and the Netherlands East Indies. Green tea, popular in Russia and America, does not undergo fermentation and comes principally from China and Japan. Oolong tea is the semi-fermented leaf from China and Formosa, the largest consumer being the U.S.A.

The tea plant flourishes best in a hot, moist climate and may be grown successfully from sea-level up to a height of 6,000 ft. Although the plant can be grown on almost any soil, it prefers light, well-drained loam. Jungle land is perhaps the ideal soil, as tea in its wild state was essentially a jungle growth.

A self-contained tea estate may comprise up to 1,000 acres. Great care has to be taken to shield the bushes from the monsoons and gales, windbreaks being provided where necessary. Soil erosion by wind and rain is another danger to guard against. A network of good roads or aerial ropeways must be provided to facilitate the transport of the plucked leaf from plantation to factory. A well equipped estate houses not only its staff, but a proportion of its labour force also. Some of the larger concerns even have their own hospitals and schools.

The bushes are usually planted in triangular formations of about 3,000 bushes to the acre. At an early stage they are cut back to encourage lateral growth and thereafter lightly pruned, so that by



Rolling tea leaves to break up the cells and liberate natural juices. The leaf is fed from an open-bottomed rotating box on to a rotating table with a brass and hardwood surface.

the time they reach maturity, in about three or four years, the bushes are about 3 ft. or 4 ft. high, a convenient height for plucking operations.

Only young, tender leaves from the side branches and stem which are known as "flush," are used for processing. Plucking is an operation of primary importance and no mean skill, for upon the quality of leaf selected depends the reputation of the estate's output. Normal plucking entails the selection of two leaves and a bud; coarse plucking includes one or more additional leaves of a less tender nature.

Women are by far the most nimble-fingered at leaf selection, and the speed at which they work is well-nigh incredible. Plucking operations are carried out at intervals of from seven to fourteen days, the growth of new flush depending upon the altitude of the estate.

What happens within the tea factory? We will consider the manufacture of black tea, the most widely consumed variety. Upon reaching the factory, the plucked leaf is first "withered." In this operation it is spread thinly and evenly upon racks until it loses much of its moisture content, a period ranging from 12 to 24 hours, depending upon climatic conditions.

Rolling is the next process. Under pressure, upon a rotating table, the leaf cells are broken up and undergo a chemical change. When the juices are exposed to the air, fermentation starts. Oxygen is absorbed, heat is developed, and the leaf changes colour and begins to give off the familiar aroma.

The leaf is next fed on to mechanical sieves, from which it emerges in a fit state for subsequent processing. In the fermenting room, the leaf is spread thinly on a tiled or cement floor in a cool, humid atmosphere, for a period varying from 20 to 60 min. This hastens chemical changes and the leaf takes on a coppery hue.

Drying or "firing" is the next process. The tea is placed on moving trays within a chamber and subjected to a continuous blast of hot air. Much skill and long experience of the work is necessary at this vital stage, as over or under "firing" would ruin the batch. The tea emerges in the state by which we all recognise it.

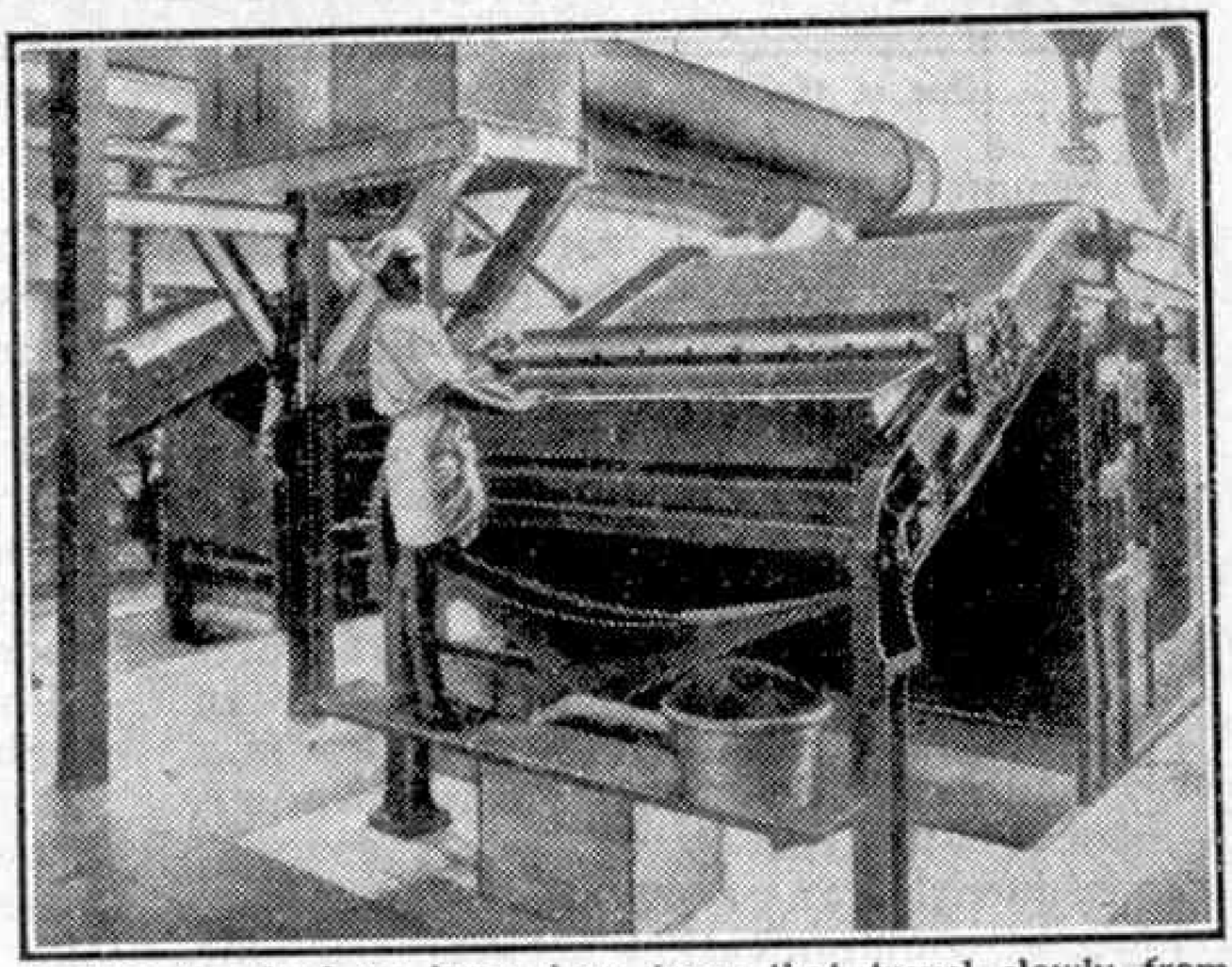
The tea is graded by sifting, according to the size of the leaf, into classifications such as Broken Orange, Pekoe, Fannings, Pekoe Souchaug, etc. The finished product is packed in the familiar ply-wood chests containing 90 to 110 lb. of leaf tea, or 115 to 130 lb. of the broken grades. Incidentally, it is interesting to note that no better type of packing has been devised than that which has so long been in operation. The containers are light and of great strength, and lend themselves to stowage aboard ship.

The war necessitated much revision in the marketing and distribution of tea. In this country, the Ministry of Food took over matters of distribution in 1942. In normal times, however, London is the nerve centre and pulse of the world's market, dealing with some 500 million pounds of tea annually. Public tea auctions were held four days a week in Mincing Lane, Indian and African teas being sold on Mondays and Wednesdays, Ceylons on Tuesdays, and Javas and Sumatras on Thursdays. The teas bought at these auctions passed on to the buying brokers, the dealers in London and the various exporting, blending and packeting firms. The most important group of purchasers were the firms who blend and packet tea with labels familiar to us all.

Most teas are "married," or blended, before they reach the public. An expert tea-taster can, by long experience, classify over 20 varieties, and in many instances name the actual areas from which they come. His sensitive palate enables him to decide what method of blending will produce the best cup of tea.

Britain's annual consumption of tea was approximately 1¼ lb. per head 100 years ago, but by 1939 it had risen to 9½ lb. Assuming one pound of tea produces 200 cups, each one of us must account for something in the region of 1,900 cups per year! We are, in fact, the world's most tea-loving people. Our nearest rivals are the people of Eire, where consumption is 7¾ lb. per head, and the next those of Australia, with 7 lb. each.

Different nations have different methods of preparing the beverage. The Russians, who prefer a Chinese variety, add to their brew a spoonful of jam and a slice of lemon. In some parts of India salt is added, while tea "off the ice" is a popular summer drink in the U.S.A. The Persian method is to us the most strange. In this the leaves are boiled until the brew is nearly black, then other ingredients are added, including fennel, aniseed, cloves and sugar!



Drying the leaf on large iron trays that travel slowly from top to bottom of a chamber through which a continuous blast of hot dry air passes.

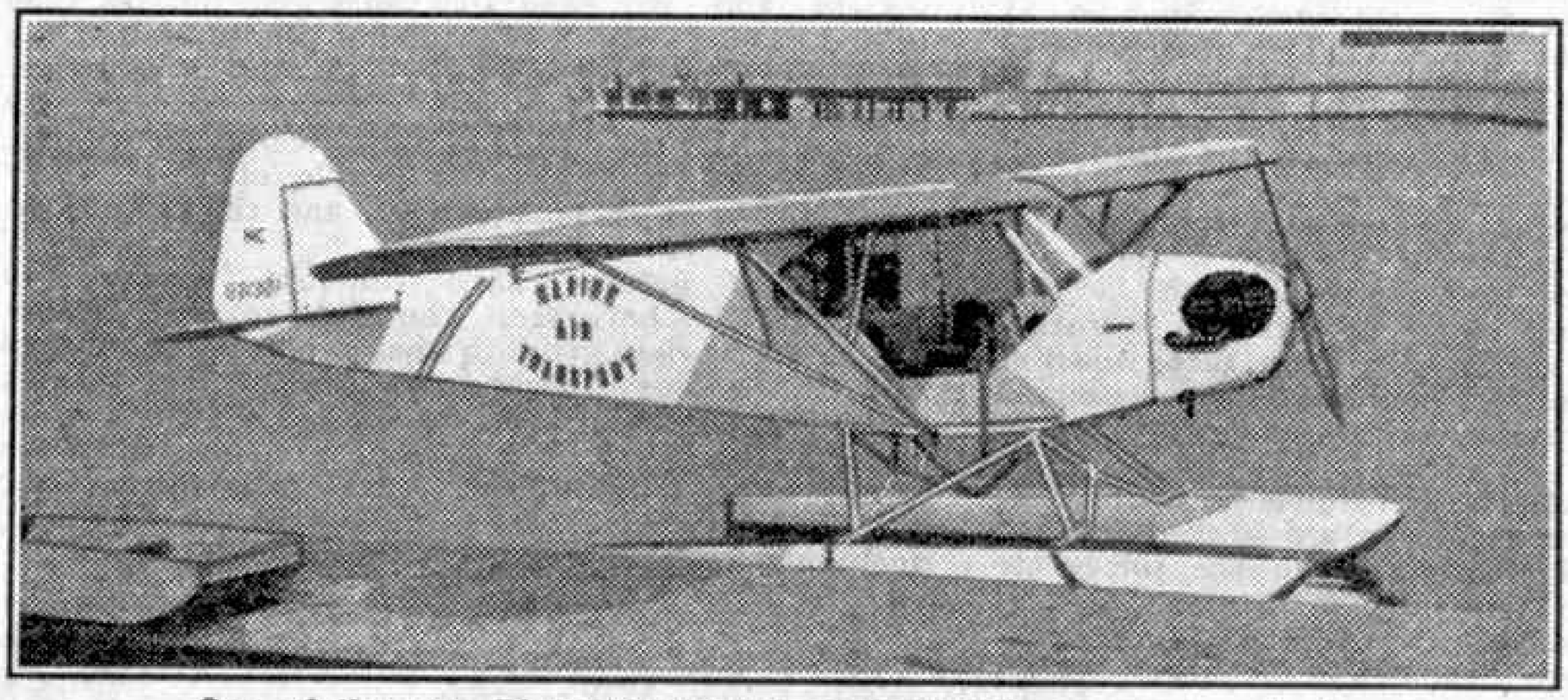
America's New Personal 'Planes

By John W. R. Taylor

IT'S easy to buy a new aeroplane in America. In fact, it is just about as easy as buying a new hat. You just walk into a shop—yes! even big department stores have real aeroplanes hanging from the ceiling—put down your money and in next to no time you are the owner of a brand-new shiny private 'plane. The urge to fly has hit America like a gold-rush, and tens of thousands of small families who before the war were content with a mere 28 h.p. motor car are now queuing up for their own light 'plane.

All that must sound very attractive to the many would-be aviators in this country, for the present restrictions, lack of suitable aircraft and high flying costs have put flying out of reach of most people over here. But, quite apart from restrictions and petrol rationing, there are many other reasons why America is able to resume private flying on a big scale long before us. For instance, many of her factories, such as the Piper plant at Lock Haven, have been building two, three or four-seat light aircraft for the USAAF right through the war and have not had to start again from scratch as have had most of our factories. Then again, there is little shortage of materials in the States, although labour disputes have seriously affected output. And an ever-present reason is that America is a big country with plenty of natural air-strips in its vast "wide open spaces," consequently an aeroplane is an ideal form of communication between outlying farms and small towns, and a forced landing does not present the same hazards as it does in our small, crowded island.

American aircraft manufacturers were well prepared for the boom. Prototypes of some of the new personal 'planes had flown long before the war ended. Others were on the drawing boards or taking shape in the companies' experimental "shops." Complete plans existed for the re-conversion of factories, so that, as soon as war contracts were cancelled, work on the production of civil aircraft could begin right away. The extent of this planning can be gauged from the fact that by last November the Piper Corporation alone were turning out over 1,000 light aircraft *each month*. And with orders for some £6,000,000 worth of their "Cubs" already in hand they do not expect a slump to follow the present boom. Even the new Globe company have contracts for their "Swift" totalling over £4,500,000, and, in all, American firms have orders for light 'planes worth £20,000,000.



One of the new Piper "Cub" two-seat aircraft, on wooden floats.

The prospective customer in America is confronted by a glittering array of single-engined light 'planes from which to choose. There are all shapes and sizes, from the tiny two-seat Ross sportsplane which sells at around £350, to *de luxe* all-metal machines with all the latest refinements such as retractable undercarriage and radio and costing anything up to £2,500, or even helicopters and amphibians. At the moment, however, the chief demand is for aircraft of three types—the popular little 65–100 h.p. braced high wing monoplanes with fixed undercarriage such as the Piper "Cub"; all-metal *de luxe* low wing monoplanes including the Globe "Swift" and Beechcraft "Bonanza," and the remarkable little "Seabee" amphibian which is in a class by itself. The helicopters are, for the most part, being left alone awhile until they grow out of present vibration, control over-sensitivity and other

Another American two-seater machine. The Cessna 140 in the air. Photograph by courtesy of the Cessna Aircraft Company, U.S.A.

difficulties. Exceptions are the two-seat Bell Model 47 and five-seat Model 42, for which a fair number of orders have been placed. The Model 42's ability to operate from small fields, roads or lawns, and range of 300 miles at 100 m.p.h., make it a very attractive proposition, and when the type has been well tested in service it may well start a big demand for helicopters.

The most popular aircraft of all is the Piper "Cub," which was the first of all the modern low-powered monoplanes and is still about the best. Before the war it had won a place as America's No. 1 sportsplane, much as the de Havilland "Moth" had done over here. During the war "Cubs" did a grand job on every battlefront, spotting for guns, carrying out rescue, communications, ambulance and dozens of other difficult tasks with distinction. Now once again rows of yellow "Cubs" are leaving Lock Haven on more peaceful missions. The "Cub" has earned its popularity. It is a sturdy little two-seater powered by a 65 h.p. Continental engine, and weighs only six hundredweights empty. It will fly for 200 miles at 73 m.p.h. and lands at only 38 m.p.h. It is a nice looking, "safe" little machine, and its price of just over £500 puts it within reach of a wide market. For those who want something a little bigger, Piper are building the "Super Cruiser," which looks very similar to the "Cub" but has a 100 h.p. Lycoming engine and a speed of 115 m.p.h. It is a three-seater with a range of 600 miles and sells for £800. Much of the success of these Piper machines is due to their high standard of safety and low price. The latter has been made possible by economical airframe design, mass production methods and superb factory layout and organisation. The factory could go inside just one of the assembly floors of any of America's giant bomber factories, and yet this company produces more civil aircraft in one month than we had flying in the whole of Britain before the war.

This sleek, beautifully finished machine is the All-American "Ensign," a two-seater. "Flying" photograph.

Pipers never put an aeroplane into production until prototypes have shown themselves 100 per cent. efficient, for their aircraft have a high tradition to keep up. So the tiny single-seat "Skycycle" which will do 115 m.p.h. on only 55 h.p., will not go into production, for it has a too-limited appeal. Neither will the "Skycoupe," a two-seater with a "pusher" engine and twin tail booms, for this layout has shown itself heavier, slower and more expensive than a conventional "tractor" type. As a result, the "Skycoupe" was abandoned in favour of the "Skysedan"

—a four-seat, all-metal low wing monoplane with retractable undercarriage, which will soon be in production. But this is really a *de luxe* type and must be classed with the "Bonanza," "Swift" and similar machines.

Other aircraft of the "Cub" type are the Aeronca "Champion" and "Chief," Luscombe's "Silvaire," the Taylorcraft "Ace" and the Cessna 120 and 140, although the Luscombe and Cessna machines are of all-metal construction and incorporate refinements that give them a higher performance—and a higher price—than the others. All sorts of clever new ideas on metal construction have been built into these aircraft to keep their price low. For example, their rear fuselages consist simply of thin sheet metal riveted over a few light transverse frames, with no other structure whatsoever. And the Cessna machines have a new undercarriage, in which each leg consists of a single leaf of spring steel with the wheels on the end. It looks light, neat but a little delicate. This is only an illusion, for a test machine was dropped to the ground so hard that its undercarriage splayed out until the fuselage hit the ground—and still the legs did not break. That gives a good idea of the structural strength of these new American light 'planes.

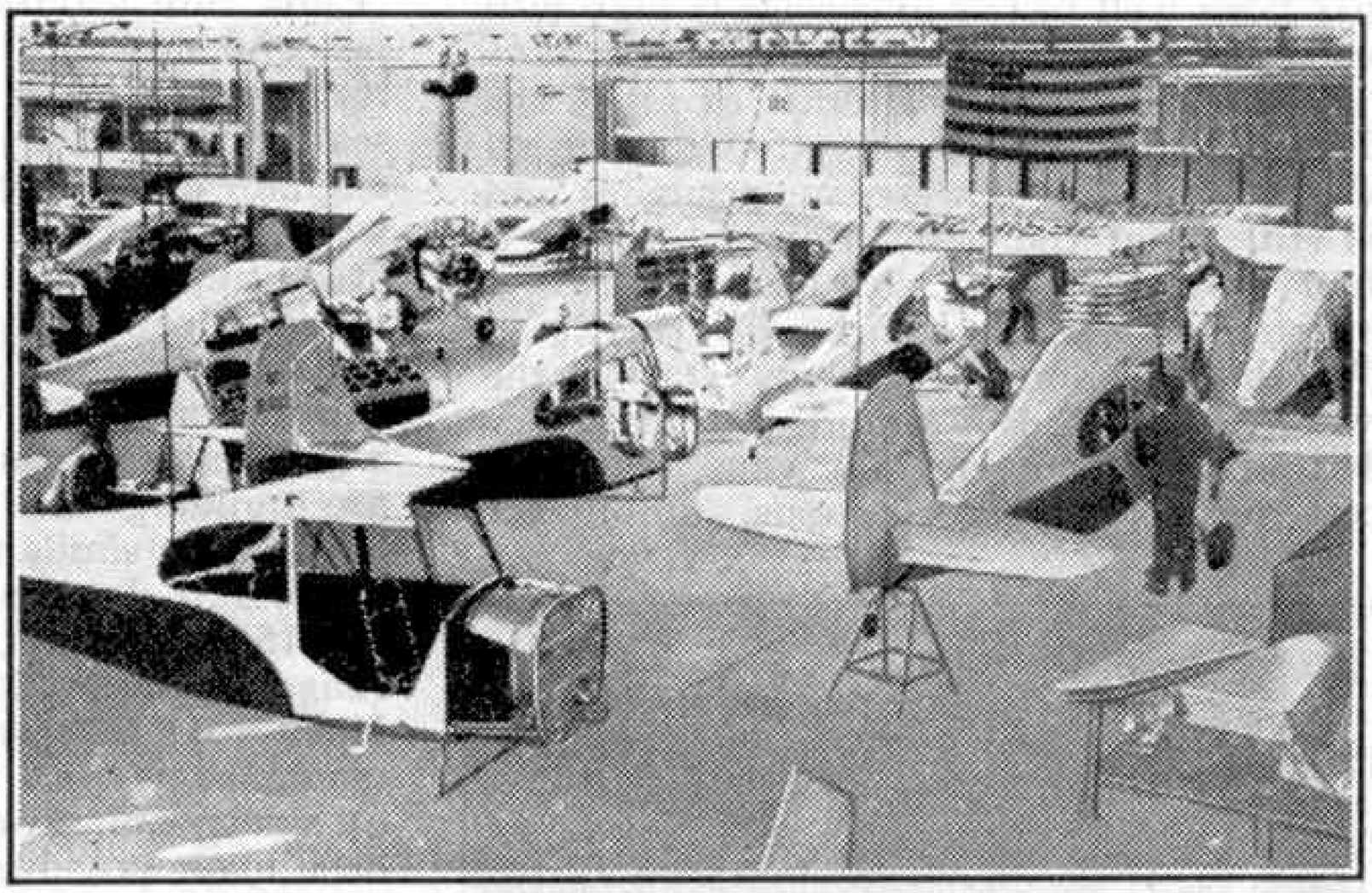
The two-seat Cessna 140 sells at about £805 and has a beautifully fitted-out cabin with dual controls. It is shown in the upper illustration on the previous page. Its 85 h.p. Continental engine gives it a speed of over 120 m.p.h., and of course its metal construction ensures a long life and simplifies maintenance. The 120 is a sort of utility version of the 140; it is basically similar but has no self-starter or flaps, and has a less luxurious cabin. It is nevertheless incredibly cheap at £670, and represents a type of aircraft that is badly needed in this country, where we have no all-metal light aircraft in production at the moment.

The *de luxe* class of American personal 'plane really started with the pre-war "Ercoupe," which was described as being spin-proof and stall-proof and is controlled solely by a "steering" wheel, with no rudder controls. It is in big-scale production now, and so are several other aircraft which share the "Ercoupe's" all-metal, low wing, tricycle undercarriage layout but not its unorthodox controls. Of these, the Globe "Swift," Beechcraft "Bonanza" and All-American "Ensign" are most interesting and in biggest demand. The "Bonanza," with its novel "butterfly" tail was described and illustrated in the March "*Air News*" pages, and represents a successful attempt by one of the large aircraft manufacturers to get into the light 'plane market. Martin, Lockheed and North American also have each built prototype personal 'planes, but the present indications are that Mr. Piper has little to fear from this direction at the moment.

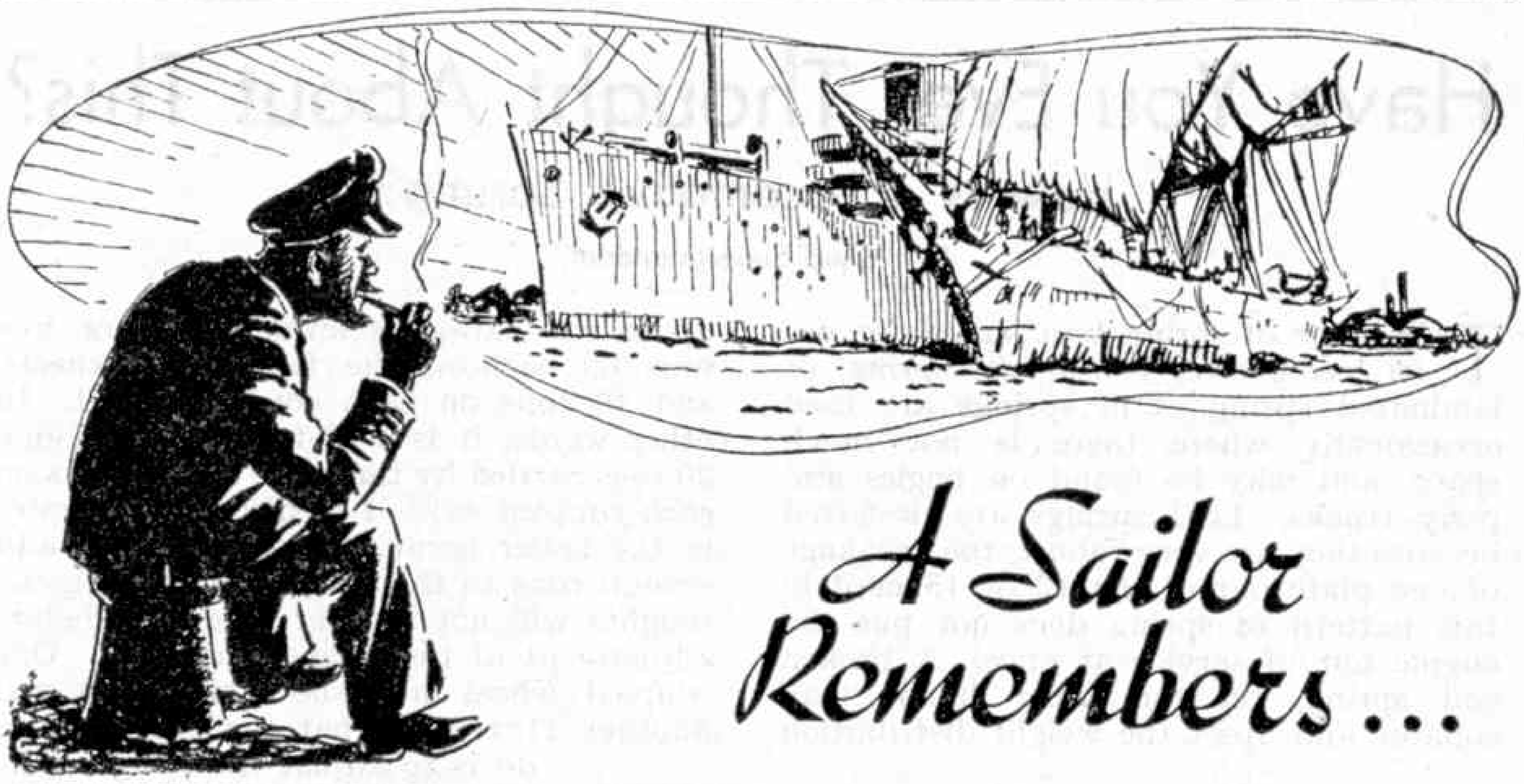
The Globe and All-American companies are newcomers to the aviation industry but have already netted very large contracts. Their "Swift" and "Ensign" are priced at £1,100 and £900 respectively, and combine elegance with high performance and strength. The "Swift" is a fairly orthodox two-seater, somewhat similar in layout to the British "Proctor," but with a retractable undercarriage. Like many of the other new American personal 'planes it has a Continental engine, in this case giving 125 h.p., and there is no doubt that much of the success of all these light 'planes is due to the availability of such an excellent range of small and efficient engines—a power range that has been sadly neglected in this country.

The "Ensign" is perhaps the most handsome of all the new light 'planes, its huge, beautifully-moulded Plexiglass cockpit cover ensuring an exceptional all-round view for its two occupants. The following extract is taken from a sales brochure, but the amazing fact is that it is almost literally true: "All-American Aircraft gives to the private flyer every advanced accomplishment in aerodynamic design, flying safety and brilliant styling that can be built into the personal airplane. Rugged all-metal construction, dependable power source, ease of handling, full vision enclosure, complete instrumentation . . . . these are but a few of the many features placing the 'Ensign' in the Number One position in the light 'plane field." And, of course, the "dependable power source" is again the well-proven 85 h.p. Continental. This sleek, beautifully-finished little machine cruises at 110 m.p.h. and could be almost everyone's dream of a post-war light 'plane come true.

But there is one revolutionary little four-seater that has captured the hearts—and cash—of an even wider section of the American private flying world. It is the "Seabee," an illustration of which was reproduced in the June 1946 "*M.M.*" Whichever way you look at this machine it is incredible. As an engineering masterpiece, it contains only 450 component parts and requires only 200 man-hours to build. It will carry four people and their luggage for 560 miles at 103 m.p.h., and when it gets to its destination can alight on land or in only 18 in. of water. And it sells at just over £1,000. Its structure has been simplified to an unprecedented extent, using car-production methods. As a result the wing contains only 30 component parts consisting of three spars, three ribs and the skin covering. And every other part of the "Seabee" shows equal ingenuity and resourcefulness. The wing floats are each made up of just two pressings, and all the "electrickery" can be installed in 11 minutes. In spite of its price, it is in every way a luxury 'plane with all-metal construction, a 215 h.p. engine, two-way radio, crash-proof fuel tank, and comfortable seats that are convertible into sleeping bunks and can also be used as rafts in an emergency. In fact the "Seabee" seems the perfect answer to everyone's demands, and may soon be seen over here as Republics have already appointed their British Agents.



Aeronca "Chief" and "Champion" light 'planes in production. Photograph by courtesy of Aeronca Aircraft Corporation, U.S.A.



A Sailor Remembers ...

Overboard and Back Again

By Capt. H. H. Neligan

MANY years ago I was Second Mate of a barque of 800 tons register loading in the Salthouse Dock, Liverpool. We were bound for Valparaiso, we got all the crew on board and towed out of dock at midnight, with the vessel in a great mess after the stevedores had done with her.

All night we worked getting gear and blocks in place, and as the wind was from the South after passing the North West Light vessel, sail was put on the ship. Off Holyhead the tug let us go and sail was made, as much as was prudent to carry as the wind was now of gale force from the South West, dead ahead of our course. That meant that we had to beat against the wind, first on one tack, then on the other.

After a couple of days we managed to get down South of the Irish Coast, when it came on to blow harder than ever. In those days when a ship left port her anchors were secured, for the time being, outside the bows, where they were lashed till the ship was clear of the land, when they were taken on board altogether and lashed on the forecastle head. Our anchors were secured on the outside of the bows, and at each dive of the vessel into the head sea they were struck by the mass of water. Now the ship's cable chain was not stowed away in the locker yet, but was still on deck, lashed in lengths on each side of the fore hatch, ready to be stowed away when the opportunity came.

I had the afternoon watch (noon to 4 p.m.). The ship was to the South of Queenstown under very short sail, and plunging and diving into a heavy S.W. sea, taking huge quantities of water over the bows. We were anxious about the anchors, for the starboard anchor was making a noise at each dive and apparently working loose.

Taking two men with me, and a small tackle, we went on the forecastle head to try and stop the anchor from working, and had just got the tackle in place when the ship took a huge dive. Down her head went, and a great avalanche of water poured over the three of us, and the fore part of the vessel. I remember being swept away, and next moment I found myself over the side holding on to a rope that had washed overboard with me, and which I involuntarily grasped. I was in the water looking up at the great bow of the ship, when she took another great dive. The next I remember was waking up in my bunk next day. It appeared that the second big dive the vessel took washed me back on board, and dashed me down on the chain cable, knocking me unconscious. I was carried to my bunk, bruised all over, each link of the cable chain leaving a black mark on my body.

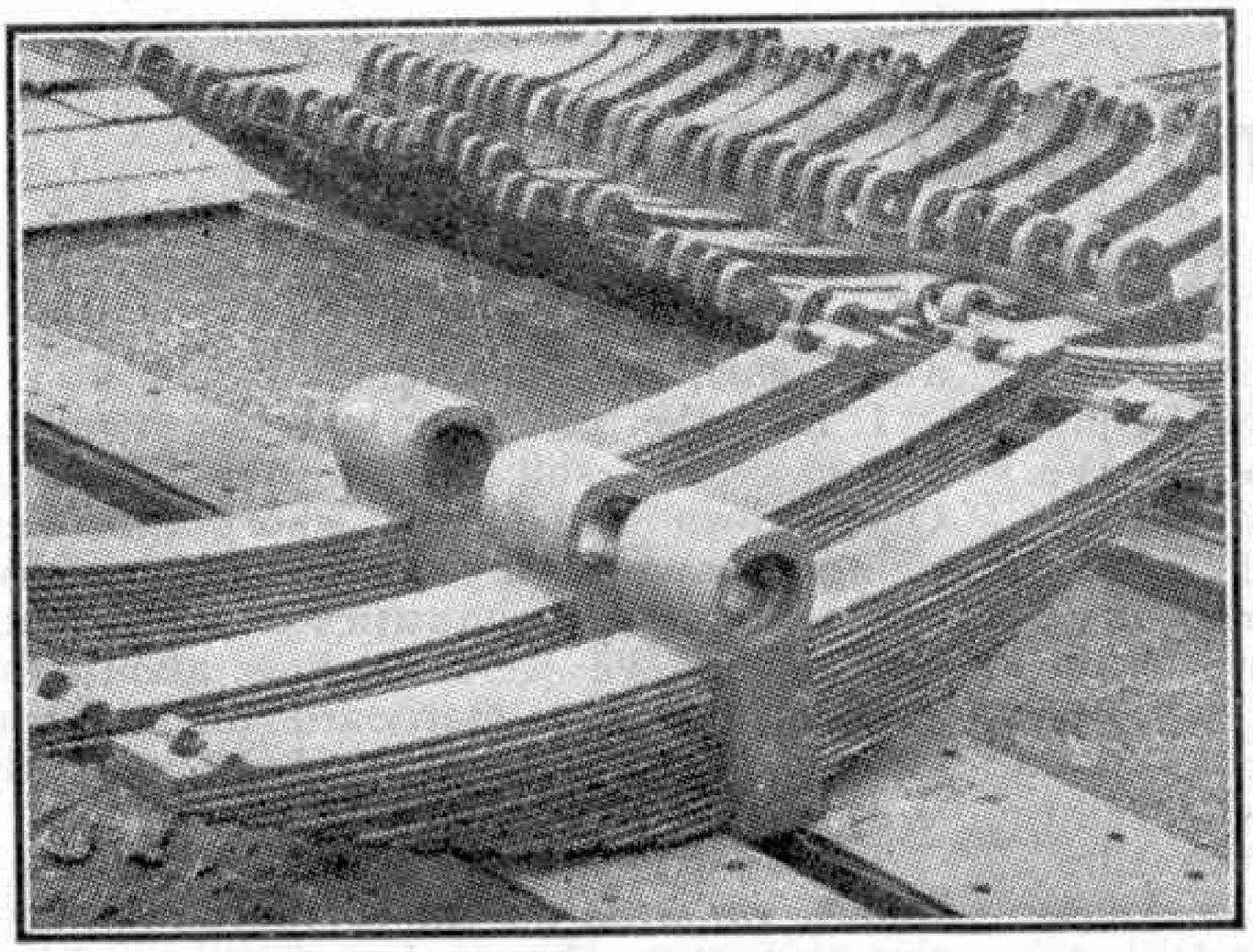
However in a week's time I was out again, but very sore and stiff.

Have You Ever Thought About This?

How is a Locomotive Sprung?

By "Shed Superintendent"

THE type of spring best suited for use on locomotives is the leaf spring, or laminated spring. Coil springs are used occasionally where there is not much space, and may be found on bogies and pony trucks. Leaf springs are preferred because they are very robust; the breakage of one plate out of the 12 or 15 used in this pattern of spring does not put the engine out of service at once. A broken coil spring, on the other hand, may collapse and upset the weight distribution of the locomotive. Leaf springs are more or less self-damping, owing to the friction between the plates, and they are more simple to make, and to repair, than coil springs.



Locomotive springs.

A leaf spring is connected to the axle-box it supports by an attachment to the "buckle," or central strap, which holds the leaves of the spring together. This can be seen in the illustration. The outside ends of the longest leaves are anchored to the engine frame by threaded bolts, known as "hangers." By means of nuts on the hangers, the weight on each spring can be adjusted to a nicety.

When an engine runs on to the weigh-bridge at the works, dials register the weight on each individual wheel. A typical 4-coupled engine, for example, in working order, with water in the boiler up to the half-glass level, will show five tons on each of the four bogie wheels, and 10 tons on each coupled wheel. In other words, it is a 60-ton engine having 20 tons carried by the bogie and 20 tons on each coupled axle. I mentioned the water in the boiler because this alone may add several tons to the weight. The foregoing weights will not register so evenly before adjustment of the springs, however. One coupled wheel may show nine tons and another 11 tons. What the fitter has to do is to adjust the hanger nuts all round to make the weights register properly and evenly.

A newly-repaired engine will start its life with correct weights on all wheels, but after a while one or more springs will relax slightly. It is not easy to determine this without a weigh-bridge, which few Running Sheds possess. You cannot see by eye if the springs are in need of adjustment. The car owner can get a rough idea if anything is wrong with his springs by putting his weight on each side of the car and watching the response of the springing. Better still, he can get someone to lie underneath and watch. A locomotive does not behave in that way—it takes four tons to deflect a locomotive spring by one inch.

In the Running Shed one checks the springs by measurement. The heights of the axle-boxes in their guides can be compared, as measured from fixed points on the engine frame, and while the engine is standing on a level piece of track. Running tests can be made by placing lumps of modelling-clay on top and underneath the axle-boxes. These lumps will be compressed in the course of a trip by the up-and-down movement of the axle-boxes, and can be examined in the Shed afterwards, to find the maximum deflection that has occurred on each spring. But anything seriously amiss with the springs is very exceptional, and if there is the slightest doubt about weights the engine is promptly dispatched to the nearest weighbridge.

Road and Track

The Twin Steering "Trusty"

The Thornycroft "Trusty" class goods vehicle, illustrated on this page, has been designed to carry the maximum load allowed for a machine in this country, where the total laden running weight of such a vehicle may not exceed 22 tons. This 14/15 ton chassis has twin steering front axles, and can be turned in approximately 70 ft. A Thornycroft Type N.R.6 direct injection oil engine provides ample power, and the fuel consumption is said to be remarkably low. A further point of interest is the auxiliary gear-box, which enables an additional range of low gear ratios to be obtained for severe road conditions.

Sheffield Corporation tramcar No. 501. Photograph by courtesy of Sheffield Corporation Transport Department.

Sheffield's Post-War Tramcar

While most municipalities are introducing buses and trolley buses to replace tram services, it is interesting to note that Sheffield Corporation Transport Department, while not producing an entirely new tramcar, have incorporated many modifications to previous designs. The tramcar No. 501, illustrated here, is an example. One very practical improvement is the use of panels of toughened safety glass on each side of the roof of the upper saloon, giving improved natural lighting. Others include larger windows, the introduction of fluorescent lighting tubes both for interior illumination and destination indicators, and the provision of correctly focussed headlamps.

The tramcar is 32 ft. 6 in. long, 7 ft. wide and 15 ft. 8¼ in. in height. There is seating accommodation for 26 passengers in the lower saloon, and 36 in the upper one.

Racing on a Frozen Lake

The Royal Swedish Automobile Club hold a Grand Prix meeting every winter. The course for this is usually the surface of a frozen lake, but this year it was necessary to use an airfield, as the necessary intense frost did not make its appearance in time. The race was held on 9th February. Many of the cars intended for the event were delayed by storms when being carried by sea to Gothenburg, and their vessel finally stuck in the ice outside the port. The result was that there were only four entries, three of which were E.R.A.s, driven by R. Parnell, L. Brook and G. E. Abecassis. These three drivers finished first, second and third in the order named.

A fortnight later a second winter race was held, this time on Lake Vallentuna, about 16 miles north of Stockholm, which was frozen to a depth of about 4 ft. This lake had been chosen for the original Grand Prix. A course was marked on it by gravel spread on the ice and frozen to it, which gave a surface that on the day of the race was satisfactory, except on certain corners where the gravel had not frozen well. The lap distance was reduced from 40 to 25 laps because of bad weather.

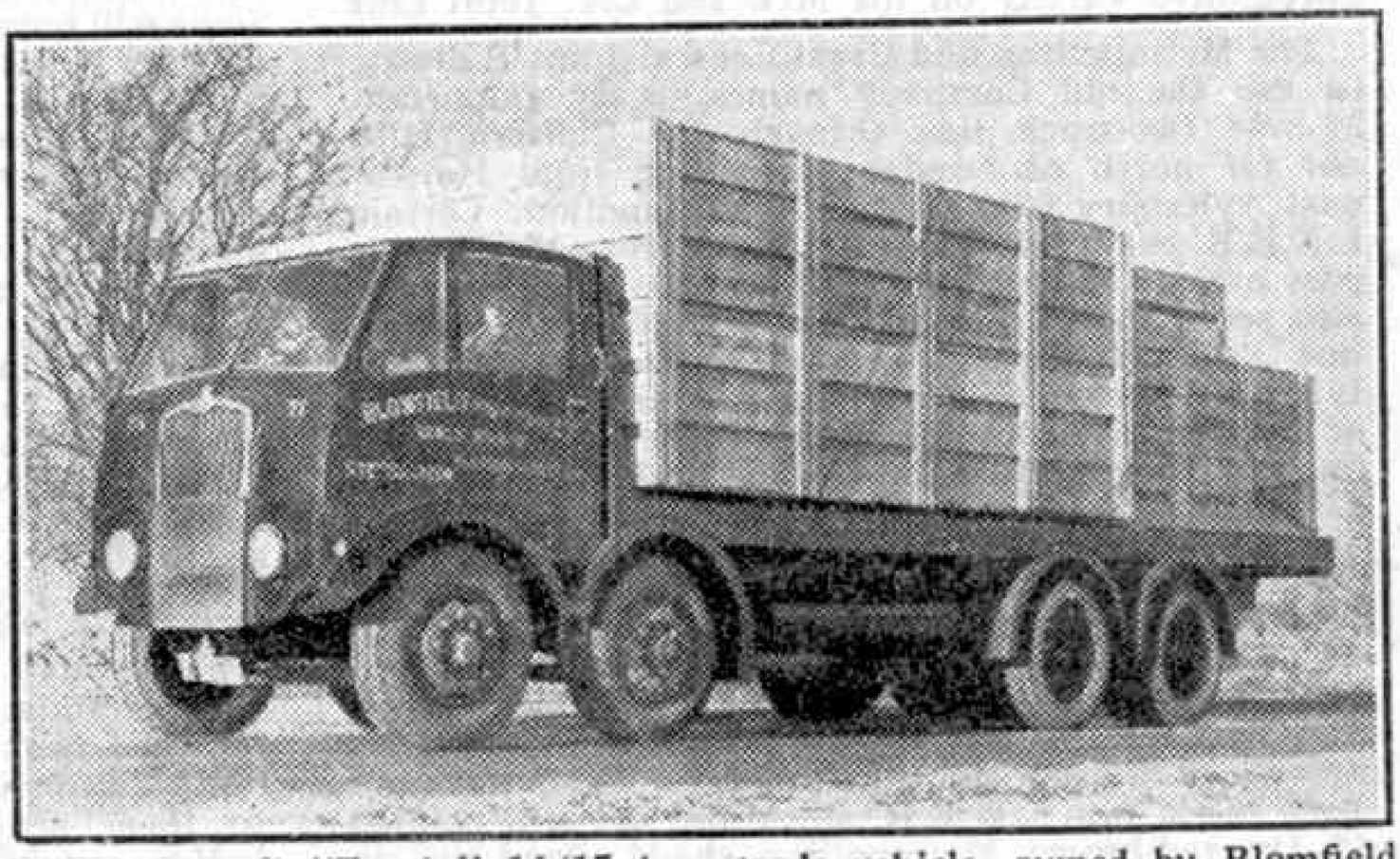
The E.R.A.s again did splendidly. Parnell was the winner at a speed of 67.72 m.p.h., and he was only a minute ahead of Abecassis. Two Delahayes were third and fourth. Brook with the third E.R.A. had to give up because of engine trouble. All the competitors had great difficulty in keeping the oil warm enough to circulate properly, which is not surprising in view of the fact that the temperature was from 15 to 20 deg. F. below zero. There was a heavy snowstorm during the actual race, and high wind throughout.

New Scottish Hill Climb

The Royal Scottish Automobile Club are hoping to organise a new hill climb on 28th June. This will take place on Rest and be Thankful, in Argyllshire, and it is expected to become a very popular event. The hill is surrounded by some of the most beautiful scenery in Scotland. It includes many bends, and in particular a sharp hairpin at the top that is certain to be the scene of an exciting finish. The 2,000-yard course can be completely viewed from the surrounding hills, which form natural grandstands.

* * * *

Between 1927 and 1945 the number of tramcars in Great Britain fell from 14,413 to 6,200.



A Thornycroft "Trusty" 14/15 ton goods vehicle owned by Blomfield (Transport) Ltd., frequently seen on the Liverpool-London route. Photograph by courtesy of John I. Thornycroft and Co. Ltd.

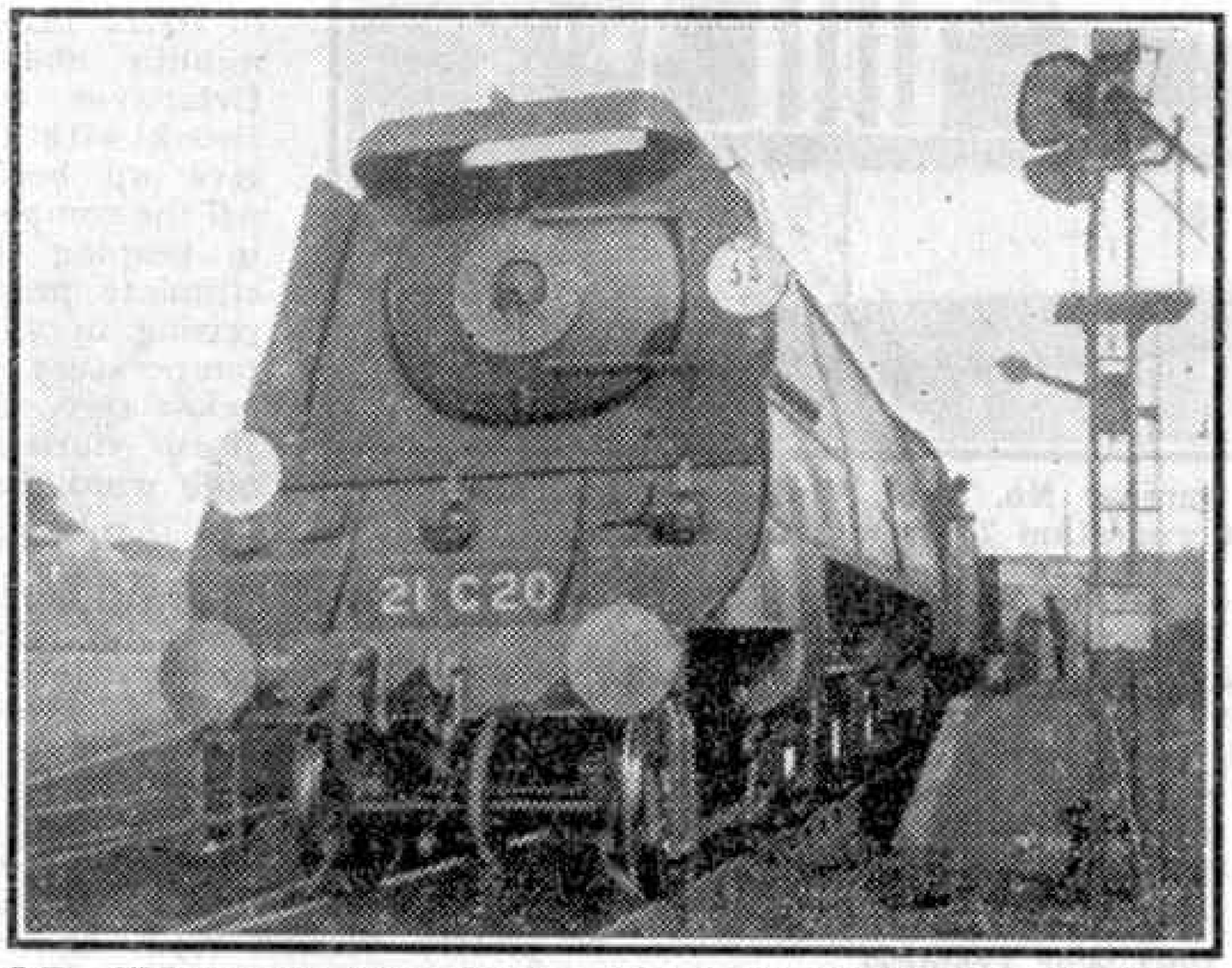
Railway Notes

By R. A. H. Weight

L.M.S. Stock Alterations

The allocation of the new light 2-6-2T engines is as follows: Nos. 1200-4 to 5A, Crewe North; Nos. 1205-6 to 17A, Derby; Nos. 1207-8 to 14B, Kentish Town; and No. 1209 to 15D, Bedford. The similar "2F" tender locomotives are so far shedded in the following order: Nos. 6400, 6403, 17A; No. 6401-2, 14B; No. 6404, 15D; Nos. 6405-7, 25C, Goole; Nos. 6408-9, 25A, Wakefield; and Nos. 6410-11, 24E, Blackpool. No. 6404 has been working on the Kettering-Cambridge branch, long the haunt of old Midland 2-4-0s or 0-6-0s on account of strict limitations on axle weight. It is in order to provide maximum locomotive power for such routes that these types have been introduced.

The latest batch of "4P" 2-6-4T built at Derby are numbered 2259-67 and allocated to 5A shed. Further class "5" 4-6-0, 2-cyl. mixed traffic engines, are Nos. 4988-90, stationed respectively at the Lancashire sheds 24E, Blackpool, 23C, Southport, and 23A, Bank Hall, followed by Nos. 4991-2 at 32A, Inverness, and Nos. 4993-4 at 12A, Kingmoor (Carlisle). The former Highland "River" class of 4-6-0 becomes extinct on withdrawal of No. 14760, while as No. 25304, "*Greyhound*" has been withdrawn, there is only one "Precursor" class 4-4-0 left. Over 30 other locomotives of various pre-grouping types also have been scrapped.



S.R. "Merchant Navy" class No. 21C 20 "Bibby Line" at Christchurch. Photograph by G. O. P. Pearce.

Locomotive Variety on the Met. and G.C. Joint Line

The Metropolitan and Great Central Joint Railway, to use the old Company names, is an important 35-mile two-track line through the Chiltern Hills not far north of London, extending from Harrow past Aylesbury to Quainton Road Junction. Certain L.N.E.R. main line expresses to or from Marylebone pass over it. That Company's outer suburban trains also serve the intermediate stations to some extent, but a more frequent service is provided by the L.P.T.B. (Metropolitan), to and from Baker Street or London City stations, with electric traction as far out as Rickmansworth. From Rickmansworth to Chesham, Aylesbury, etc., steam tank locomotives are in charge over steep gradients under L.N.E.R. auspices though partially utilising former Metropolitan locomotives. During the past year L.N.E.R. (G.C.) 4-6-2, 2-6-4, 4-4-2 or 0-6-2T engines have shared these duties with Met. 2-6-4 and 0-6-4 locomotives and even the small "E" 0-4-4T engines lettered L44, 46 and 48 of early Metropolitan days, which have not been taken into L.N.E.R. stock and are still painted in the red-brown Metropolitan shade, lined out in cream and black. The Metropolitan 0-4-4T type was originally developed from the Stirling design on the former South Eastern Railway.

L.N.E.R. News

New "A2" 6 ft. 2 in. 4-6-2 express locomotives in service or completing at the time of writing are: Nos. 518 "*Tehran*," 519 "*Honeyway*," 520 "*Owen Tudor*," and 521 "*Watling Street*." Nos. 515-7 previously reported are stationed at Heaton; No. 518 is at Gateshead, also near Newcastle-upon-Tyne. "A2/1" No. 508 is named "*Duke of Rothesay*," it is painted black and has smoke deflectors, as on other Thompson engines. According to latest information, No. 507 has no name yet.

Construction of "B1" 4-6-0s is proceeding apace. By the end of 1946 those built by the North British Locomotive Company Ltd. had reached No. 1113, following immediately on to the 1947 series now coming into traffic numbered 1114 up. Nos. 1089-99 and 1105-7 are stationed at Hitchin; No. 1112-4 and 1121 at King's Cross; Nos. 1087-8, 1108-11 and 1122-3 at Sheffield; and Nos. 1120 and 1124-7 at Doncaster. Others are distributed to sheds in Scotland, as well as on the G.E., G.C., and N.E. sections.

The Darlington built series carry "Antelope" names such as "*Wildebeeste*," "*Waterbuck*," "*Puku*," "*Topi*," "*Oribi*," on Nos. 1010-14 respectively. No. 1010 is working from Hull (Botanic Gardens). Nos. 1011-14 are working from Gateshead. It is understood that Nos. 1015-8 are allocated to York. Nearly all those mentioned are painted green. In an emergency due to shortage of steam on a "V2" No. 1091 took over a 500-ton north express at Hitchin and worked it non-stop to Grantham, proving the general service utility of this numerous and powerful class.

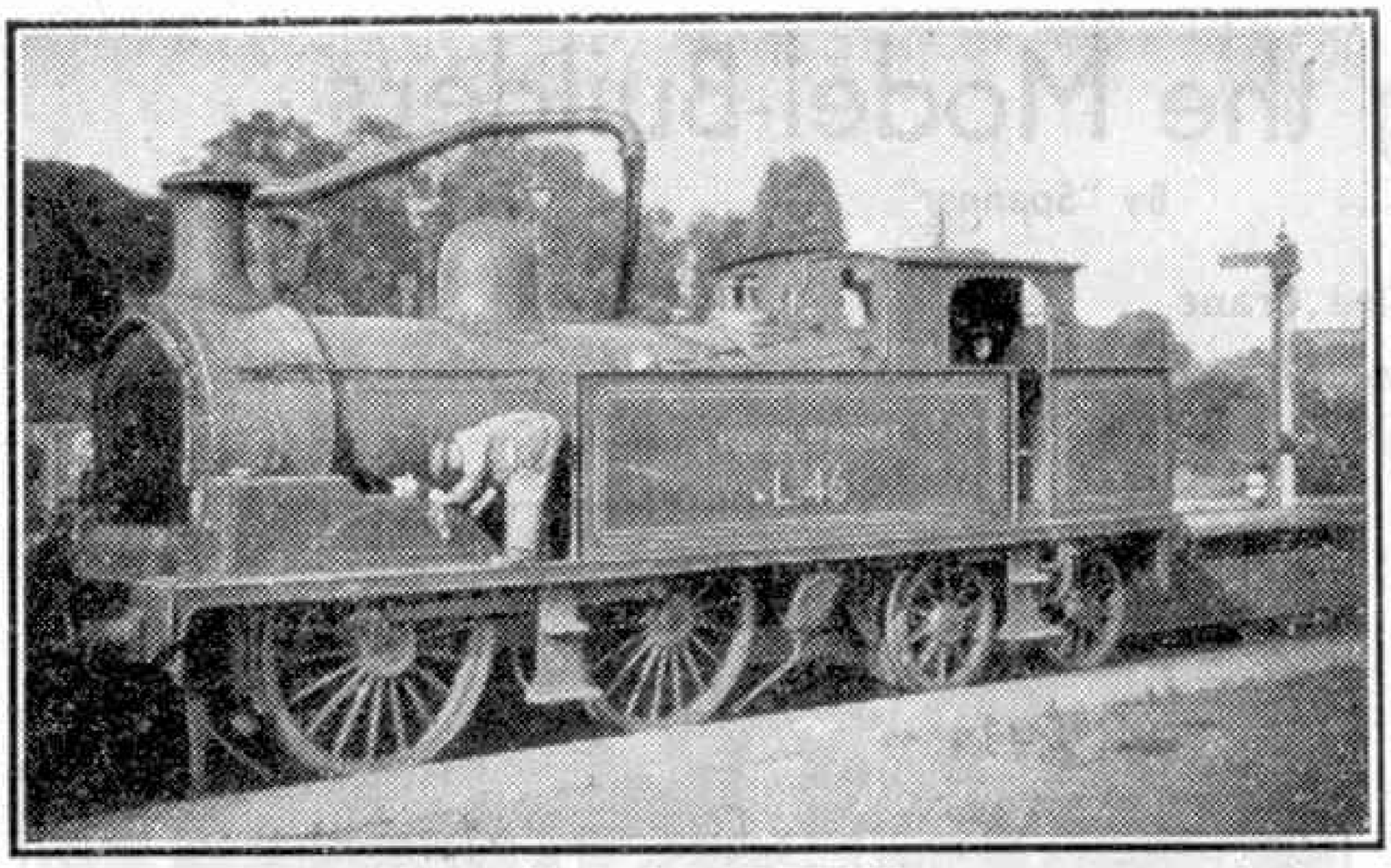
The Company is purchasing 200 "Austerity" 2-8-0s from the Government; these will be numbered 3000-3199 and classed "07." Many of them are already at work from various sheds, carrying Ministry of Supply 7xxxx numbers. Some will burn oil fuel. Others are being reconditioned for the L.N.E.R. at Brighton or Eastleigh Works, S.R. The L.M.S. type "06" 2-8-0s in L.N.E.R. stock numbered 3500-67 instead of 3100-67, with a consequence that "04s" intended to be numbered between 3500-67 in the new scheme are being given higher blank numbers. Thus the 2-8-0s that were given numbers 3500, 3506 and 3508 in the new scheme become 3572, 2594 and 3600 respectively, and so on.

Renumbering is almost complete and unless otherwise stated the new numbers will be quoted in these notes from now on.

Recent "Pacific" conversions from "A10" to "A3" 4-6-2 with 6 ft. 8 in. driving wheels, 220 lb. per sq. in. boiler pressure and three 19 in. cylinders are Nos. 103 "*Flying Scotsman*," 57 "*Ormonde*" and 70 "*Gladiateur*," leaving five still in original state.

Fifty "04" 2-8-0s have by now been rebuilt to "01" standard. All "J25" N.E.R. 0-6-0s have returned from loan to the G.W.R. The L.M.S. type "8F" 2-8-0s built by the L.N.E.R., and so far used by them, are going over to the L.M.S. They carry L.M.S. numbers 85xx.

No. 2849, formerly 4419, the Ivatt "Atlantic" which for some time was fitted with a "booster," and has a side window cab, has been overhauled at



London Transport (Metropolitan) 0-4-4T "L46" on a passenger train at Aylesbury. Photograph by A. J. Read.

Doncaster Works and returned to traffic painted black. Many more members of this famous class have been withdrawn, including No. 2872, the one-time G.N. Royal engine, easily recognisable from the crest on its splashers and brightly polished buffers and other metal work. This engine made a remarkable run from King's Cross to Grantham with a military special in 1916, later rendering splendid service as L.N.E.R. No. 4442 on the Pullman expresses between London and Leeds for a number of years in charge of Drivers Sparshatt and Hammond. It was the writer's privilege in 1929 to travel on the footplate of No. 4442 with the former expert when the *Harrogate Sunday "Pullman"* was brought into King's Cross 6 min. early, notwithstanding 12 min. delays due to signal stops or slowings.

Nos. 1603 *"Framlingham,"* 1614 *"Castle Hedingham"* and 1617 *"Ford Castle"* are further conversions from 3-cyl. "B17" to 2-cyl. "B2" 4–6–0, with higher boiler pressure. The "L1" 2–6–4T No. 9000, so far the one example of a new standard type, is still travelling round for trials on various duties from different English or Scottish sheds, as are the converted 2–6–0s Nos. 1863 and 1997. A down coal empties train on the G.N. main line was lately observed hauled by 2–8–0 No. 79180 piloted by "J3" 0–6–0 No. 4153. Express engines still help with coal and freight train operation, and there have been acute difficulties on account of ice and snow, as on other British lines.

Southern Tidings

American-built 0–6–0 saddle tanks purchased, 14 in number, will be numbered 61–74.

"West Country" 4–6–2s had been completed up to No. 21C 152 at the end of 1946 and construction is still proceeding. Nos. 148–53 are stationed at Salisbury and work to Waterloo, Exeter and elsewhere; Nos. 21C 141–7 are attached to Exmouth Junction shed, Exeter.

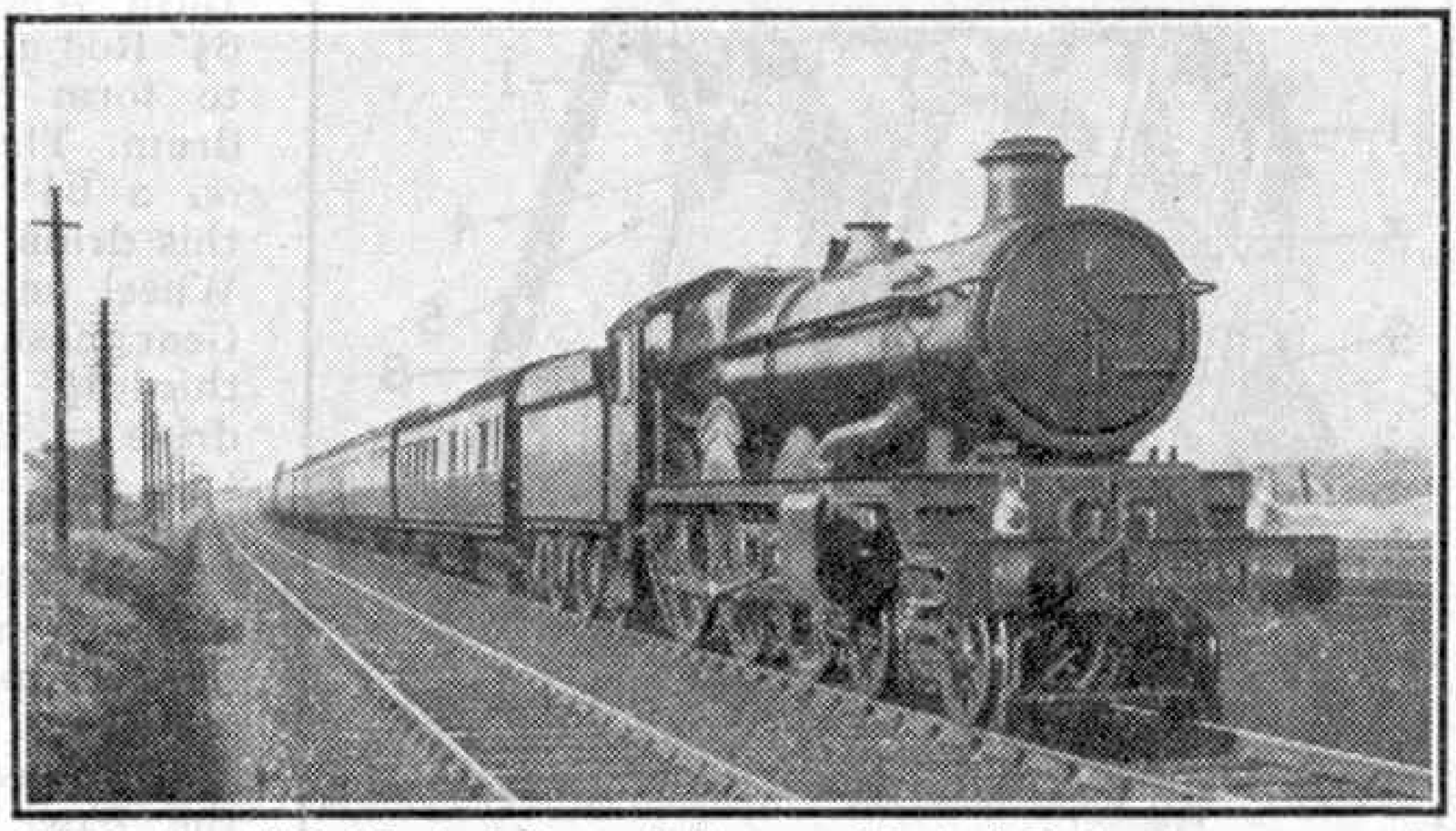
The 4–4–2 well tank, of Adams' 60-year old design, which was No. 0488 on the L.S.W. duplicate list, then East Kent Railway No. 5, has now been taken back into stock as S.R. 3488 and reconditioned at Eastleigh with a Drummond pattern boiler. She will presumably be a spare engine for the Lyme Regis branch which has to have very light locomotives, a reason for the retention in service of the veteran sister engines Nos. 3125 and 3520. The last Adams' outside cylinder 4–4–0, class "X6" No. 658, has been withdrawn, but there are still several of the class in the Works yard. Further withdrawals of "A12" 0–4–2 tender engines are Nos. 614, 620, 624–5, 630, 652 and 658. Stroudley "D1" 0–4–2T No. 2255, "11x" 4–4–2T No 2597, both former L.B.S.C., and "K10" L.S.W. 4–4–0 mixed traffic locomotives numbered 136, 149, 342 and 344 are listed for scrapping, so that inroads are being made in some classes that had up to now remained intact.

Snifting (relief) valves, which admit air to superheater elements when engines are standing or running with steam shut off, have been removed from the exterior of the smoke-boxes of a number of engines of different types. "Q" 0–6–0 No. 546 is another of that class to have multiple-jet blast pipe and large chimney.

A number of Central Division locomotives have been transferred from New Cross Gate shed, London, to Bricklayers' Arms and other depots, as the closing of New Cross as a main shed is intended.

"L" class 4–4–0s Nos. 1761–3 are the largest engines so far stationed at Tonbridge, whence they work to London Bridge via Oxted, Charing Cross, Ashford and Hastings. No. 2215, fitted for push-and-pull working, has recently been thoroughly overhauled and painted in latest black style at Brighton Works for duty at Tunbridge Wells West. She is over 70 years old, having begun life in 1875 as L.B.S.C. No. 18 *"Stockwell."*

The vast carrying capacity as well as the popularity of the giant liner *"Queen Elizabeth"* involves a railway transport problem of no small magnitude. It is usual for six or seven special trains to be run between Waterloo and Southampton Docks in connection with each arrival or departure of this magnificent ship. "Merchant Navy" engines have hauled boat specials on important occasions: *"Cunard White Star"* in connection with the pioneer passenger sailing of *"Queen Elizabeth,"* and *"United States Lines"* for the s.s. *"America."*



G.W.R. No. 5049 "Earl of Plymouth" on up West of England express passing Iver. Photograph by C. R. L. Coles.

Among the Model-Builders

By "Spanner"

A Fine Remote Controlled Crane

An excellent model crane using an electro-magnetic system of gear selection, which operates on a 250-volts A.C. supply, was built recently by J. S. Edmonston, Swansea. The model ran for three days, working for nine hours each day, during a Hobbies Exhibition held at Swansea Grammar School. The crane is operated from a remote control unit, and carries out all the normal operations.

Electro-magnets are used for changing the gears and a Meccano 20-volt Motor supplies the driving power. The reversing switch from the Motor was transferred to the remote control panel, and the Transformer is housed in the control box itself. Four gears control the luffing, hoisting and swivelling and the drive to the bogie.

The drive from the Motor is taken from a Pinion by a Contrate, on the Rod of which is a ½" Pinion that transmits the power to the gears driving the four movements. Any one of these gears is brought into mesh with the ½" Pinion by energising the respective electro-magnet from the remote control panel.

Fig. 2. A fine remote controlled crane, built by J. S. Edmonston, Swansea, who is seen demonstrating the model at a school exhibition. A South Wales "Evening Post" photograph.

Crane Winding Mechanism

An interesting winding gear for a model crane or derrick is illustrated in Fig. 1. It incorporates two drums for hoisting and luffing and is fitted with lever-controlled ratchets and an efficient foot brake.

The winding drums 2 and 3 are Wood Rollers. The drum 2 is mounted on a 5½" Axle Rod 4 and is locked to it by Collars and Bolts. Bush Wheels 5 are locked on the 6½" Rod at each end of the Roller 2 to form flanges for the winding drum. The drum 3 is also mounted on a 6½" Rod. The flanges for this drum are provided by a Bush Wheel and a 57-teeth Gear. The Gear meshes with a ½" Pinion on a third 6½" Rod and this provides the drive to the drum.

A Pawl 7 mounted on a Rod journalled in the 3" Strips engages the Ratchet Wheel 6 and is kept in position by a Spring. One end of the Spring is attached to the end of a ½" Bolt mounted in a Collar fixed on the Rod supporting the Pawl. The other end of the Spring is hooked to the side of the framework. A lever is used to

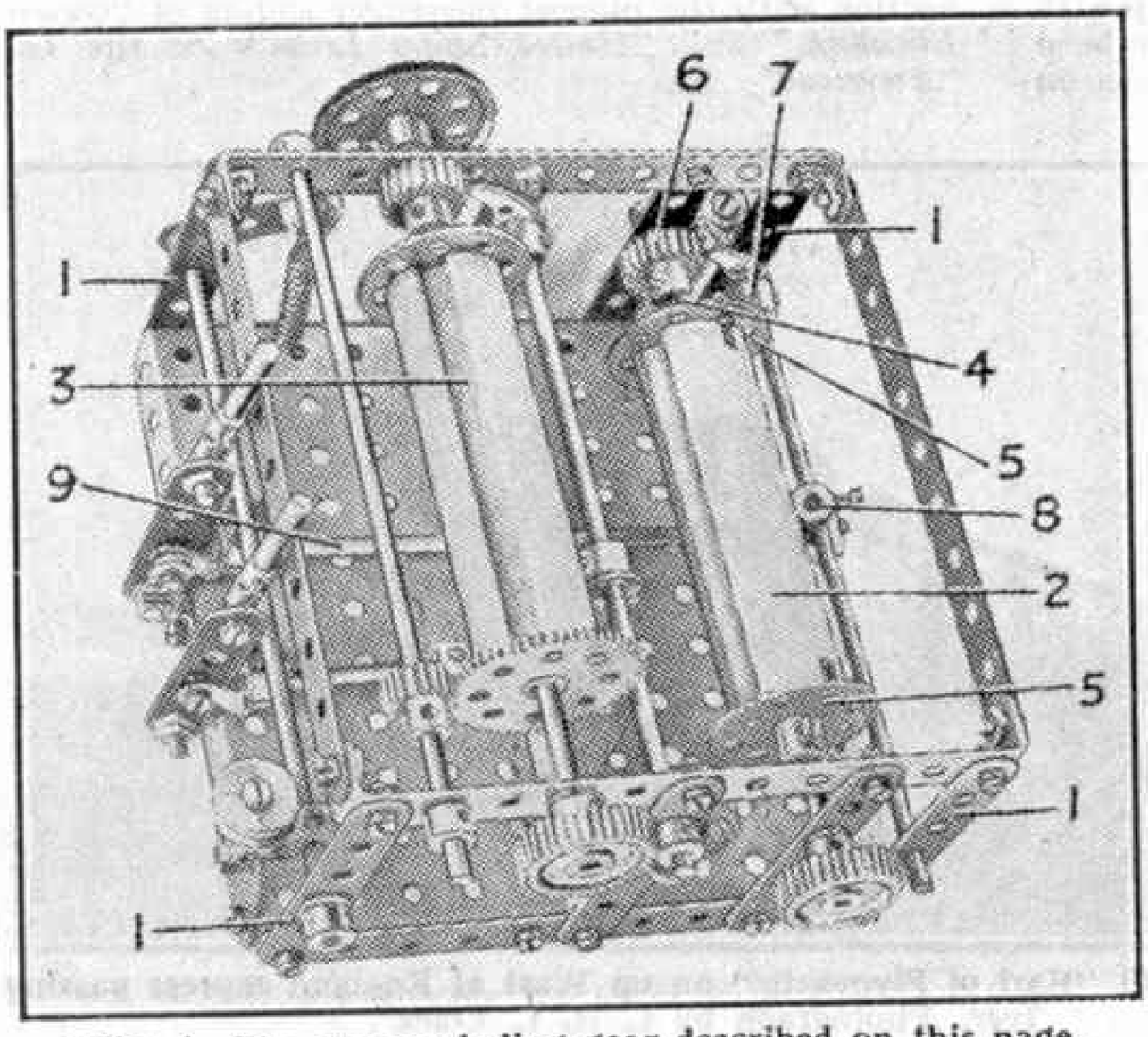


Fig. 1. The crane winding gear described on this page.

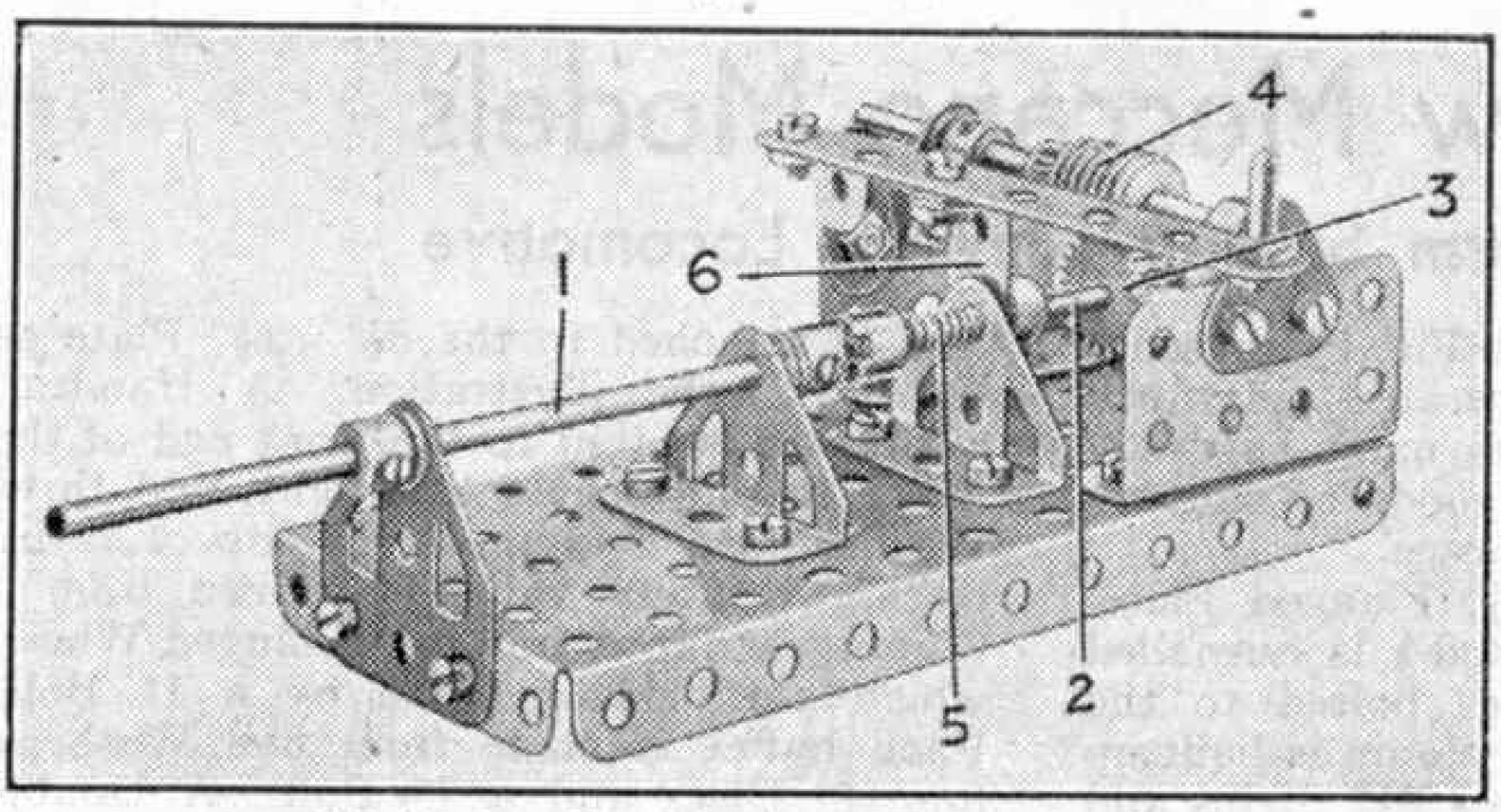


Fig. 3. A useful drive de-coupling mechanism.

disengage the Pawl and is connected by a small Fork Piece to a Coupling 8 locked to the Rod carrying the Pawl. The Fork Piece on the end of a 5½" Rod 9 is attached to a lever, seen at the side of the model, by an End Bearing. The lever, a 2" Strip, is pivoted on a ⅜" Bolt locknutted to an Angle Bracket. A small piece of a Spring is used to hold the lever against the framework to take up the play and avoid chatter.

A ratchet control similar to the above is fitted to the drum 3 and is released by means of a second lever shown in the illustration.

A foot brake is provided for the drum 3 which is the main hoist. A 2" Pulley is used for the brake drum and a length of cord is taken over it, one end being attached to the framework and the other end to the end of a Single Arm Crank mounted on a 6½" Rod. The end of the Crank is attached to a Spring by means of an Angle Bracket. A Coupling is attached to the Rod supporting the brake Crank and is used as a footbrake. A ½" Pulley attached to the end of the Coupling forms a pedal.

Dog Clutch Mechanism

A useful de-coupling arrangement using a Dog Clutch and sliding Pinion may be built up as shown on this page. The arrangement is mounted on a 5½" × 2½" Flanged Plate. The Rod 1 takes the drive to the model and is connected to the de-coupling device by means of a Dog Clutch. The other member of the Clutch is locked to the end of Rod 2 that also carries a ½" Pinion 3. The Pinion engages a Worm 4 that takes the drive to the mechanism. A compression Spring 5 is used to hold the members of the clutch together and maintain the two Gears in mesh.

A lever mounted over the top of the mechanism has a ½" × 1" Angle Bracket 6 attached to it. The Rod 2 is passed through the end of the Angle Bracket.

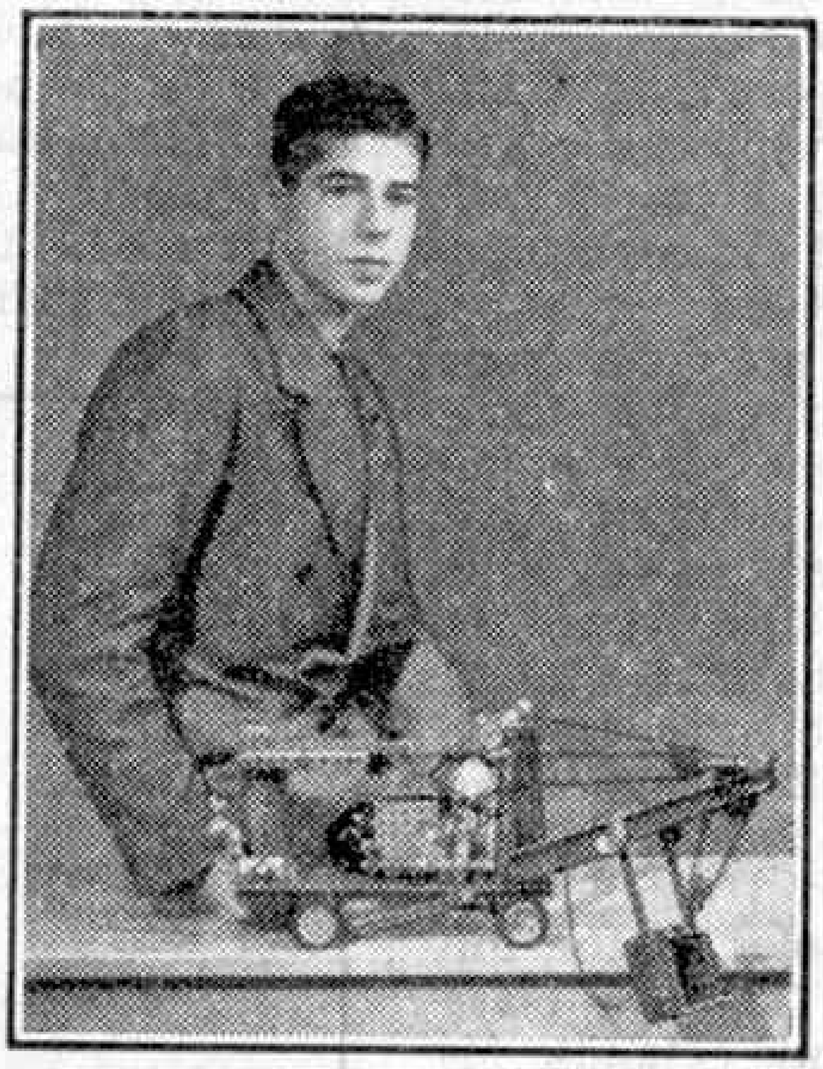


Fig. 4. Hrch. Wellenmann, Winterthur, Switzerland, who won a prize in a recent "M.M." Competition.

"SEPTEMBER MODEL-BUILDING CONTEST" RESULTS
(OVERSEAS SECTION)

The principal prizes in this competition were awarded as follows: 1st, Cheque for £2/2/-: Pablo Giese, Buenos Aires; 2nd, Cheque for £1/1/-: H. Weilenmann, Winterthur, Switzerland; 3rd, P.O. for 10/6: Pierre Cumbeaux, Meaux, France.

P. Giese was awarded First Prize for the fine model of an underground railway station complete with an electric train, which is illustrated below. The train is fitted with two pantographs made from Collars and Screwed Rods, and these pick up electric current for a 20-volt Motor built into one of the travelling bogies.

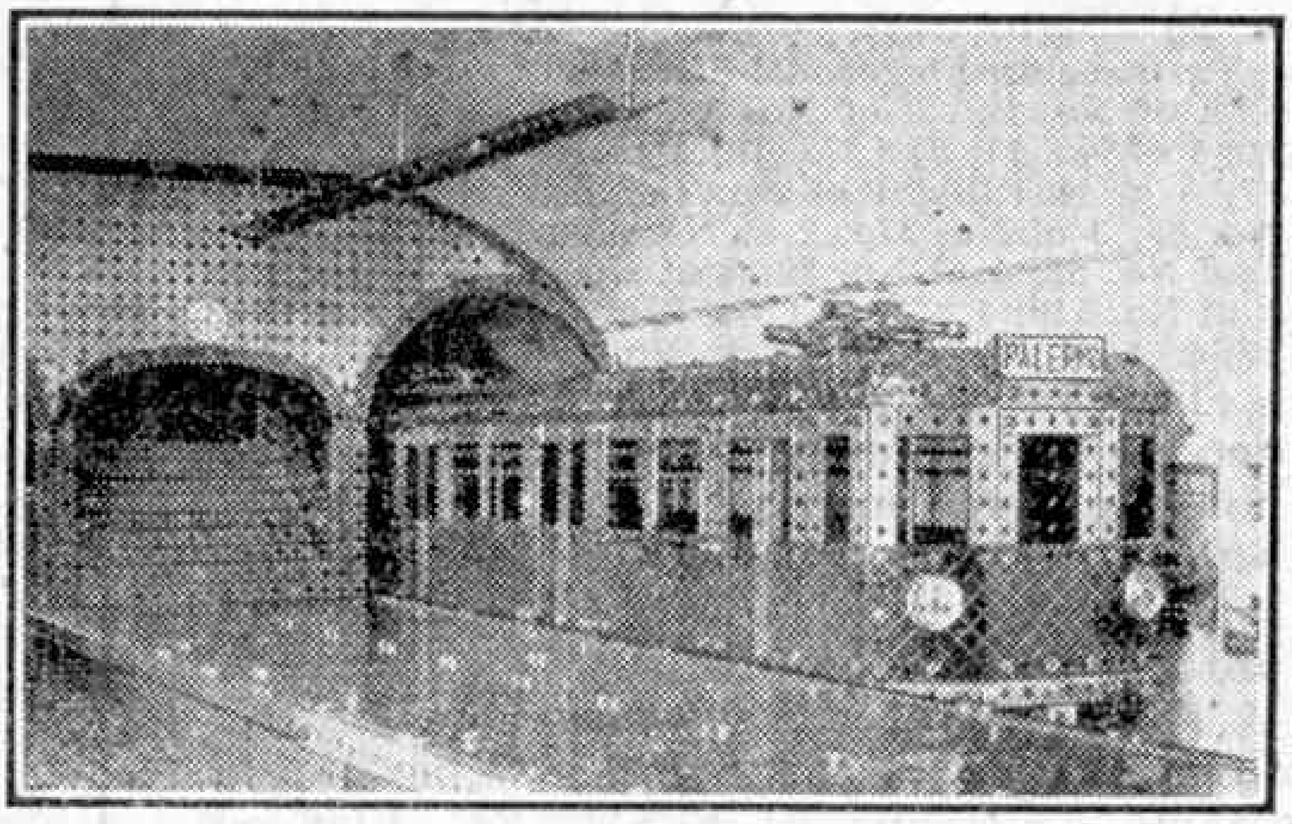


Fig. 5. A reproduction of a station and train on the Buenos Aires underground railway system. It is the work of Pablo Giese, Buenos Aires.

New Meccano Models

Platform Stacker—Fireless Locomotive

THE model illustrated in Fig. 1 represents a mobile hand-operated platform stacker. It is used, as its name suggests, to lift and carry heavy goods to suitable storing places in warehouses.

The base is a 5½" × 2½" Flanged Plate, and the front axle, a 3½" Rod 1, is journalled in two Triangular Plates bolted to the front of the base. The column is built up from two 12½" Strips, two 9½" Strips and two 3½" Strips. A 2½" × ½" Double Angle Strip 2 spaces the top of the 12½" Strips and two 9½" Strips are joined to the base by the 3½" Strips. Two Eye Pieces 3 slide on the 12½" Strips and support a 3½" × 2½" Flanged Plate. Handrail Supports 4 are bolted through the second holes in the 3½" × 2½" Flanged Plate and are connected to the Eye Pieces by 1" Rods.

The front wheel supports are made from two 1" Triangular Plates connected by a Double Bracket 5. The front holes in the Triangular Plate carry a large Fork Piece 6 held in place by a 2" Rod that is kept in position by Spring Clips. Two 1" Pulleys are mounted on the 2" Rod and the whole assembly is connected to the base by a Flat Trunnion. The bolt 7 connecting the bogie to the Trunnion is lock-nutted.

A 3½" Rod carrying two 1" Pulleys is journalled in the second holes at the top of the 12½" Strips and is kept in place by Collars. A 3½" Crank Handle is supported in a Channel Bearing bolted to the base. Each end of the Crank Handle carries a 1" Pulley spaced from the bearings by Collars. A 10" Driving Band is clamped to each side of the 3½" Flanged Plate by a 2½" Strip.

Parts required for model Platform Stacker: 2 of No. 1; 2 of No. 1a; 2 of No. 3; 1 of No. 5; 2 of No. 10; 1 of No. 11; 2 of No. 16; 1 of No. 16b; 1 of No. 17; 3 of No. 18b; 1 of No. 19s; 8 of No. 22; 22 of No. 37; 3 of No. 37a; 2 of No. 48a; 2 of No. 50a; 1 of No. 52; 1 of No. 53; 4 of No. 59; 4 of No. 77; 1 of No. 116; 1 of No. 126a; 2 of No. 136; 1 of No. 136a; 4 of No. 142c; 1 of No. 160; 2 of No. 186.

The locomotive shown in Fig. 2 is a model of a fireless type of engine used for shunting purposes. In an engine of this type, the "boiler" merely serves as a reservoir for live steam, which is injected into it under high pressure by means of a valve at the front of the locomotive.

The model is commenced by building a frame consisting of a 5½" × 2½" Flanged Plate 1 and a 3½" × 2½" Flanged Plate 2 bolted together. A Boiler fitted with one End is attached to the 5½" × 2½" Plate as shown in the illustration. A Handrail Support 3 is fitted to the front end of the boiler to represent a headlight, and three Washers are held on each side of it by bolts. A safety valve is formed from a Chimney Adapter and a ¾" Flanged Wheel, which are held in place by a 1" Bolt. Each buffer is made from five Washers, four ¾" Discs and a ¾" Bolt. A Double Bent Strip 4 is bolted to the front of the frame and one to the rear to form coupling devices.

The front of the cab is made from two 2½" × 1½" Flanged Plates, one vertical and one horizontal, which are attached to the frame by Angle Brackets. A 1½" Strip is attached to the top of the vertical 2½" × 1½" Flanged Plate and an Angle

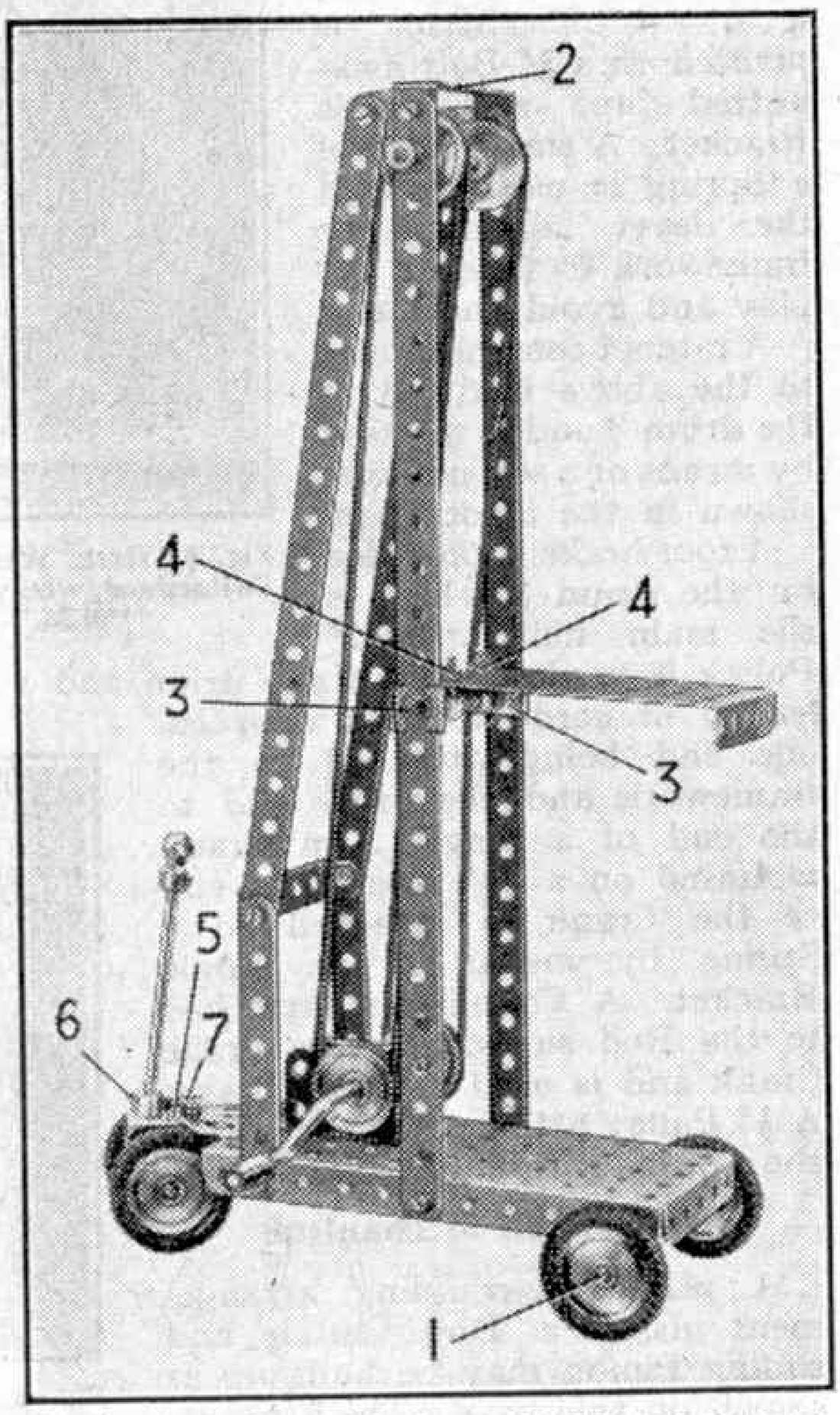


Fig. 1. A simple model of a useful lifting and travelling truck, used in warehouses.

Bracket is used to join this to the Boiler. Two 3″ Strips and a 3″ Flat Girder 5 form the front sides of the cab and they are extended at the bottom by a 1½″ Flat Girder 6 and a 1½″ Strip.

The footplate is made by attaching a Trunnion to a 3½″ × ½″ Double Angle Strip that is bolted to the flanges of the 3½″ × 2½″ Plate. A handrail is provided by a 1½″ Rod, attached to the 1½″ Strips at the side of the cab by Handrail Supports.

The back of the cab is made from two 2½″ × 1½″ Flanged Plates 7 joined at each side by 3″ Strips and attached to the base by a third 2½″ × 1½″ Plate bolted crosswise. The rear windows are made from two ¾″ Discs. The sides of the cab are connected at the top by a 2″ Strip.

Curved Strips 8 are bolted at the front and rear of the cab to give the necessary curvature to the roof. The Curved Strip at the front is attached to a 2½″ Strip connected to the sides by Angle Brackets.

The bogey in which the wheels are mounted is built from two 5½″ Strips 9 attached to the underside of the frame by four Trunnions. The supports for the wheel axles are provided by six 1″ Triangular Plates bolted to the 5½″ Strips. A 3½″ Axle Rod is used for the front axle and one for the rear, and the centre axle is a 3½″ Rod. Six 1⅜″ Flanged Wheels are used and these are fixed to the axles with their flanges inwards. Two Collars are placed on each end of the front and the rear axle to support a 5½″ Strip.

If desired the model may be driven by a *Magic* Motor, placed in a suitable position.

Actual engines of this type are capable of developing considerable power, and they carry out many useful duties in places where it would not be economical or safe to employ an ordinary type of locomotive.

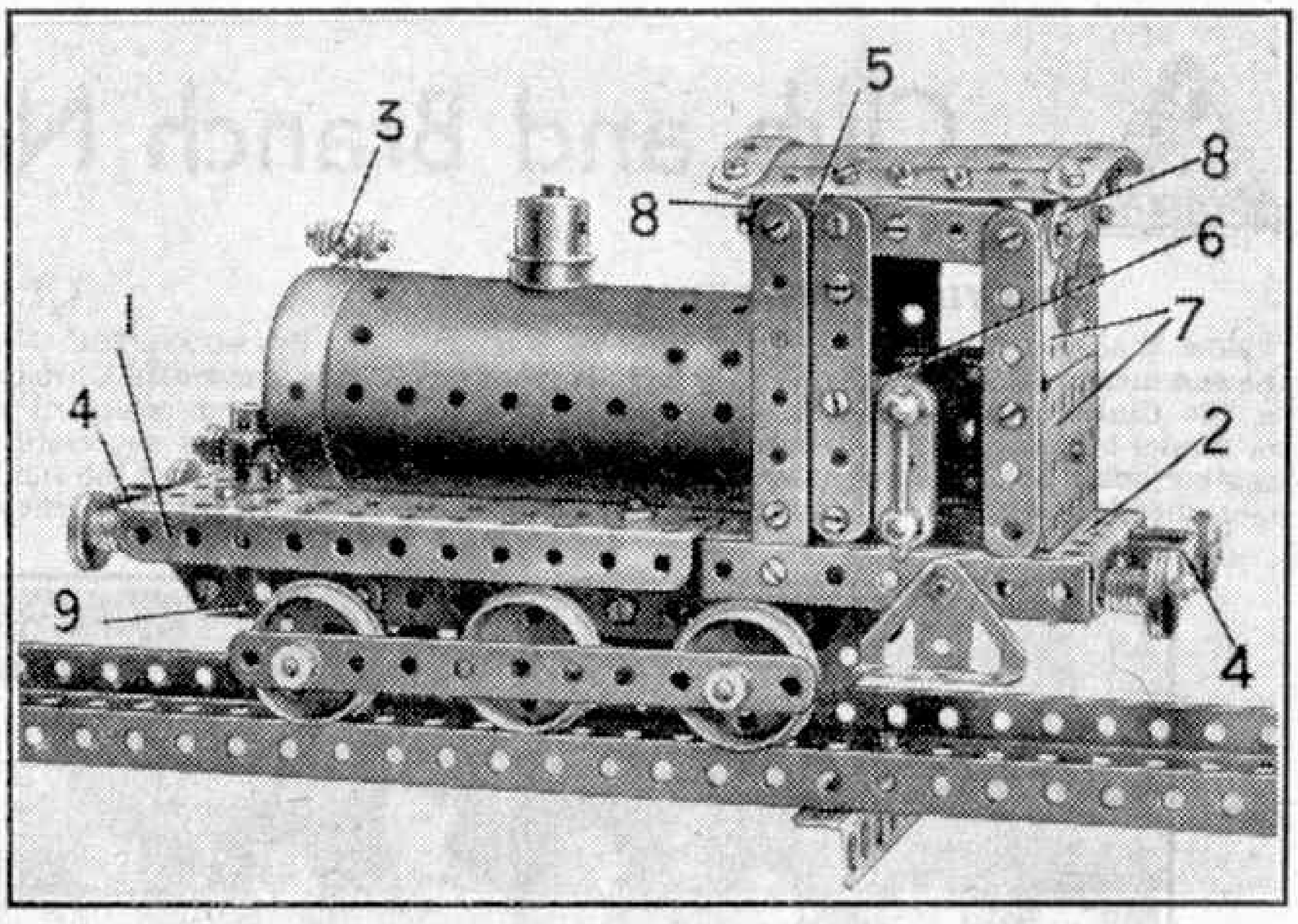
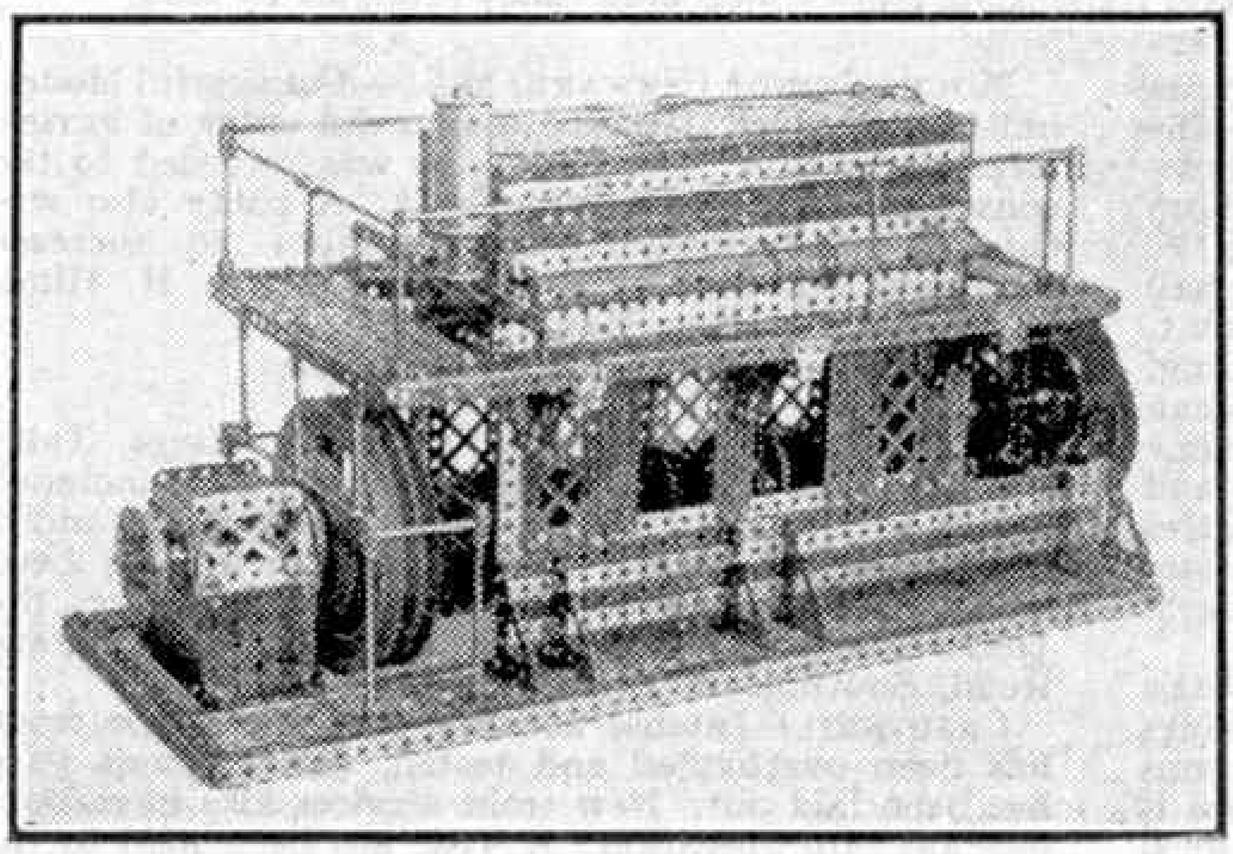


Fig. 2. A fireless type locomotive, reproduced in Meccano.

Parts required to build model Fireless Locomotive: 4 of No. 2; 4 of No. 3; 4 of No. 4; 4 of No. 5; 2 of No. 6; 3 of No. 6a; 5 of No. 12; 2 of No. 15a; 1 of No. 16; 2 of No. 17; 6 of No. 20; 1 of No. 20b; 78 of No. 37; 10 of No. 37b; 45 of No. 38; 2 of No. 45; 2 of No. 48b; 5 of No. 51; 1 of No. 52; 1 of No. 53; 8 of No. 59; 1 of No. 63a; 6 of No. 77; 2 of No. 90; 2 of No. 103c; 2 of No. 103h; 2 of No. 126; 5 of No. 136; 1 of No. 162a; 1 of No. 162b ;1 of No. 164; 2 of No. 190.



A fine model Diesel engine built by J. E. Matthews, Coventry.

A COMPETITION REMINDER

Last month we announced details of the "*March Model-Building Contest.*" This competition for Meccano models of all kinds is still open for entries, and we are repeating the conditions and requirements governing entries for the benefit of readers who did not see the original announcement.

The model itself is not required. All that should be sent are a photograph or drawing and a few notes to explain special constructional features. Each photograph or drawing must bear the competitor's name and address and age, and the entry should be forwarded to "*March Model-Building Contest, Meccano Limited, Binns Road, Liverpool 13.*"

Entries will be divided into two sections. A, for competitors of all ages living in the British Isles; B, for competitors of all ages living Overseas. Section A will close on 30th April, but Section B will remain open for entries until 31st July.

The following prizes will be awarded in each Section of the Contest: First, £2/2/–; Second and Third Prizes will consist respectively of £1/1/– and 10/6. There will also be five further prizes of 5/–, and Certificates of Merit.

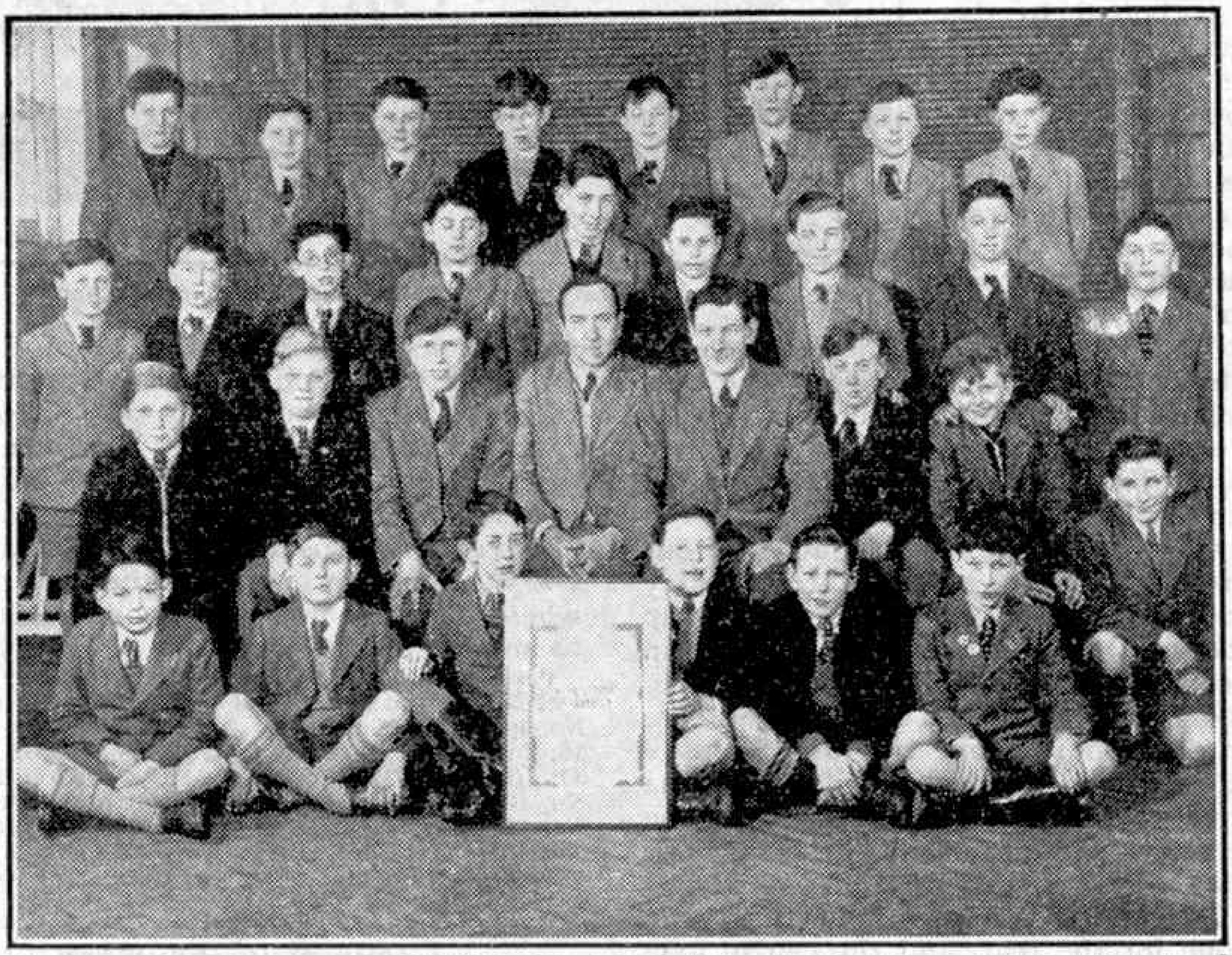
Club and Branch News

ENJOYING SUMMERTIME

Now that April is with us it is time to consider the summer programme. This should include meetings in the Club room for games and social events, or for model-building and the running of trains for the weather may at times be unfavourable for the outdoor meetings that must form the chief feature of this season. All meetings, indoor or outdoor, must be carefully planned if they are to be really enjoyable and helpful. In addition they must have the whole-hearted support of members, and it is therefore advisable to settle details at a general meeting.

The next important point to watch is there shall always be a definite aim in view for each event. Parties can be arranged for such pursuits as cycling, swimming, boating and rambling, and cricket too can be played. The long evenings of double summertime can be devoted to fun and games of this kind, and on Saturdays trips can be made to railway centres or junctions, to main lines where well-known expresses can be seen, or to some resort, at the seaside if possible, for a few hours of pure enjoyment.

The financial side of excursions requires a little forethought. The best plan is to open a Club Savings Bank, into which members can pay small sums weekly, beginning now. Where this is done there is usually enough in hand to meet the expenses of local trips, and similar arrangements can be made for special excursions to greater distances.



Members of the Winchmore Hill Collegiate School M.C., Leader, Mr. G. Watts, Secretary, J. Bartholomew. This Club was affiliated in October 1925, and under the able guidance of Mr. Watts it has resumed activities on an extensive scale since the end of the War. Members are grouped into working parties for Meccano Model-building and Hornby Train operation. The 21st birthday of the Club was celebrated by a remarkably successful Exhibition, from which Club funds benefited by £50.

CLUB NOTES

PLYMOUTH M.C.—All sections have been active since the successful Christmas Parties. The Stamp Section has been reformed with great success. A Parents' Night was successful, and there was a splendid contribution to Club funds. Club roll: 60. *Secretary:* D. M. Candy, 10, Whitefield Terrace, Lipson, Plymouth.

MOUNT SENIOR (NEWARK) M.C.—Asuccessful Model-building Contest attracted a splendid entry of lorries, jeeps and boats. The first prize was awarded to the constructor of a collapsible boat. A party also was enjoyed, and membership continues to increase satisfactorily. Club roll: 31. *Secretary:* J. H. Hind, 28, Hatton Gardens, Newark, Notts.

BRANCH NEWS

BRISTOL RAILWAY CIRCLE—Many meetings, Talks and Visits have been arranged. These have included a trip to the Swindon Works of the G.W.R. and a Film Show. A Junior Section Committee has been formed to discuss various topics concerning the Junior Section. *Secretary:* R. F. Bigg, 76, Pen Park Road, Southmead, Bristol.

CRAIGWEIL—Intense activity continues. The track has been overhauled and tested, and a goods yard has been laid out. New train services also have been brought into operation. A Visit has been paid to the local goods yard. *Secretary:* J. S. Evans, Two Orchard, Aldwick Bay Bognor Regis, Sussex.

Engineering Notes

A Mobile Excavator Crane

The illustrations on this page show a Mobile Excavator Crane manufactured by Thomas Smith and Sons (Rodley) Ltd., Leeds. The machine is designed so that it can be equipped for various kinds of excavating and load lifting work, and it comprises a revolving superstructure carried on an eight-wheeler chassis. The superstructure rotates on a ring of tapered steel rollers, and the mechanism is operated by an engine independent from that which operates the chassis. Hoisting and lowering of loads is carried out through a toggle clutch and the engine hydraulic coupling, by means of which complete control of the hoisting and lowering operations, or of digging operations when the machine is used as an excavator, is obtained. A powerful foot-brake also is provided.

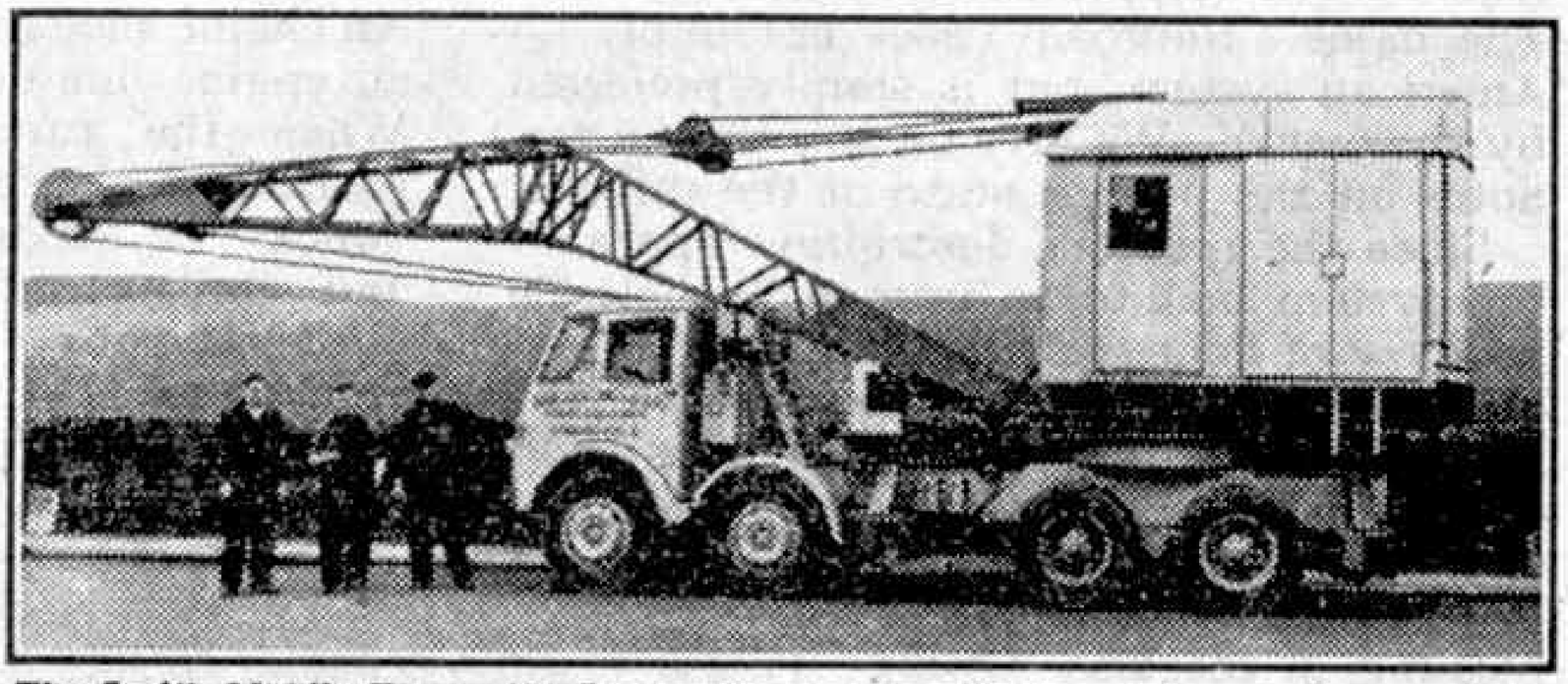
A special feature is the jib, which is an all-welded unit of high tensile steel. It is built in six separate sections, and these can be joined together to give alternative jib lengths of 30, 40, 50, 60, 70, and 90 ft. The jib can be fitted with all the usual digging equipments including a navvy shovel, drag line, skimmer scoop, drag shovel, and grab. If desired pile-driving equipment also may be used.

When fitted with the 30 ft. jib the crane is capable of lifting a maximum load of 12 tons at a radius of 10 ft., and with the 90 ft. jib it will lift 3½ tons at a radius of 25 ft.

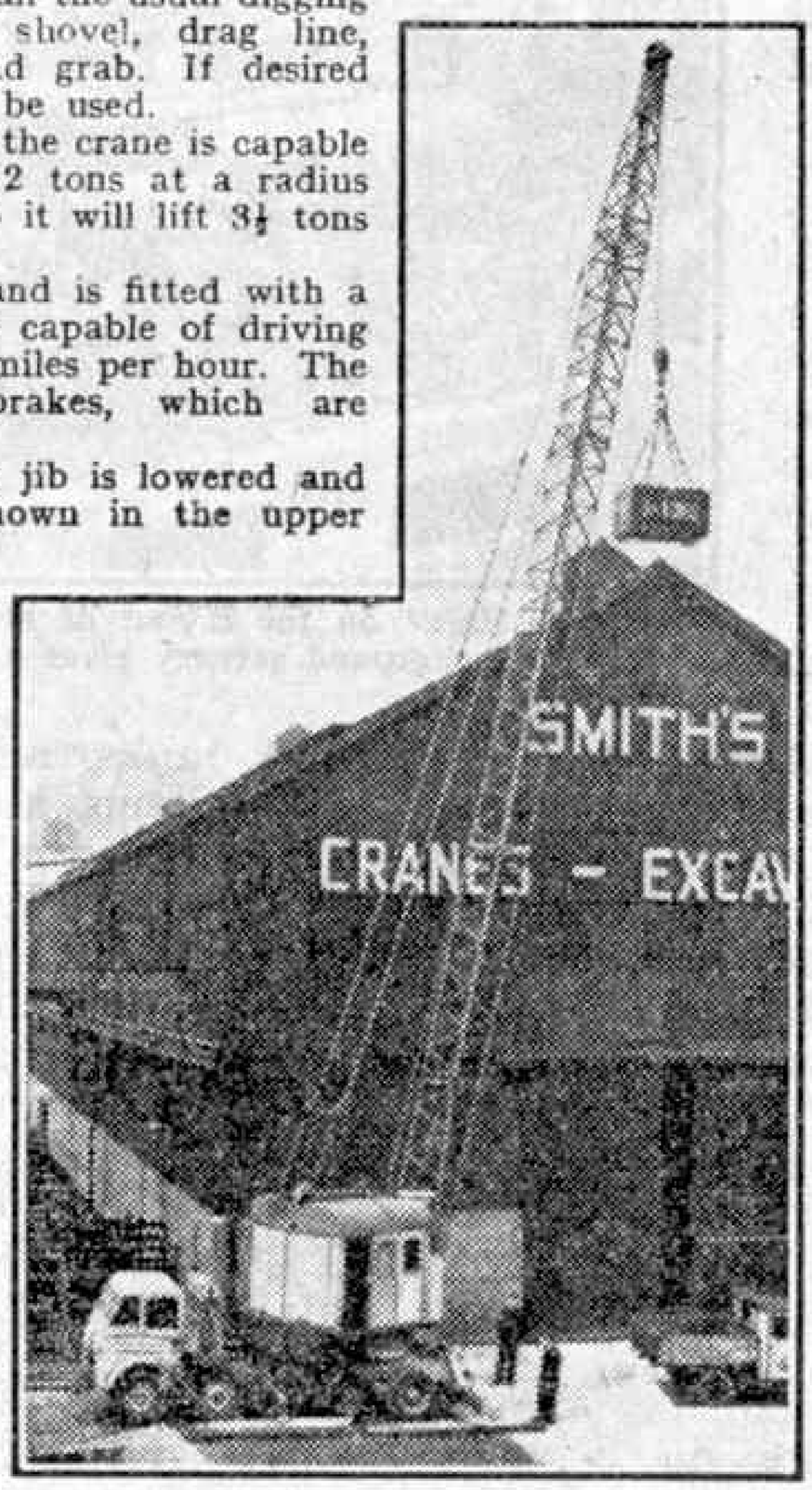
The chassis has eight wheels and is fitted with a six-cylinder diesel engine that is capable of driving the machine at speeds up to 20 miles per hour. The lorry is fitted with Servo brakes, which are hydraulically operated.

In the travelling condition the jib is lowered and slung over the lorry cab as shown in the upper illustration.

The machine is 23 ft. 3 in. long, 8 ft. in width, and is fitted with floating driving axles.



The Smith Mobile Excavator Crane with shortend jib lowered ready for travelling.



The Mobile Excavator Crane described on this page. Here it is seen equipped with full length jib and crane hook. Photographs on this page reproduced by courtesy of Thomas Smith and Sons (Rodley) Ltd., Leeds.

Jet Engines for Ships

Practical experiments are being carried out in Great Britain and the United States in the construction of ships propelled by gas turbine power plants, similar to but much larger than those built for jet driven aeroplanes. In these engines, air is sucked in, compressed and heated. In an aero engine it is then ejected through jets placed in the tail and thus pushes the plane through space. In the case of a marine engine, however, the jet is directed against the blades of a turbine, which in turn is connected to the propeller shaft.

It is understood that a ship now being built in Great Britain will have a 6,000 h.p. jet plant, while another 10,000 ton vessel is under construction in America

A Big Job at Grand Coulee Dam

In order to meet the heavy wartime needs for electric power, the generating plant at Grand Coulee Dam in Eastern Washington, U.S.A., was augmented by two 75,000 k.w. generators, that were originally designed and built for the Shasta Dam, in California. These two generators were installed as a temporary addition but they had to be mounted on just as solid foundations as the permanent plant at the dam. When the war ended work was put in hand to remove the generators ready for installation in their permanent home at Shasta Dam. The job of excavating the 6,500 tons of reinforced concrete which locked them in place in the power station was a very tricky operation, as it had to be carried out without damaging or disturbing the other costly generators and equipment in the power house. For this reason explosives could not be used, and the work had to be carried out with compressed-air driven tools, which cut the concrete into huge blocks. These were then lifted and removed by an overhead travelling crane.

Three new 108,000 k.w. generators are now being installed permanently in the power house, thus bringing the total of such units at the Grand Coulee Dam to nine.

An Excavator that Hops

A novel dragline excavator of a very large type, and which can raise itself on supports like crutches to swing over soft ground, is now in operation in America. When it is at work the machine rests on a large circular platform, but when it moves from one site to another it advances in huge steps by means of giant shoes placed at the sides of the machine. By lowering and raising these the machine moves forward in a series of hops, until the new working position is reached.

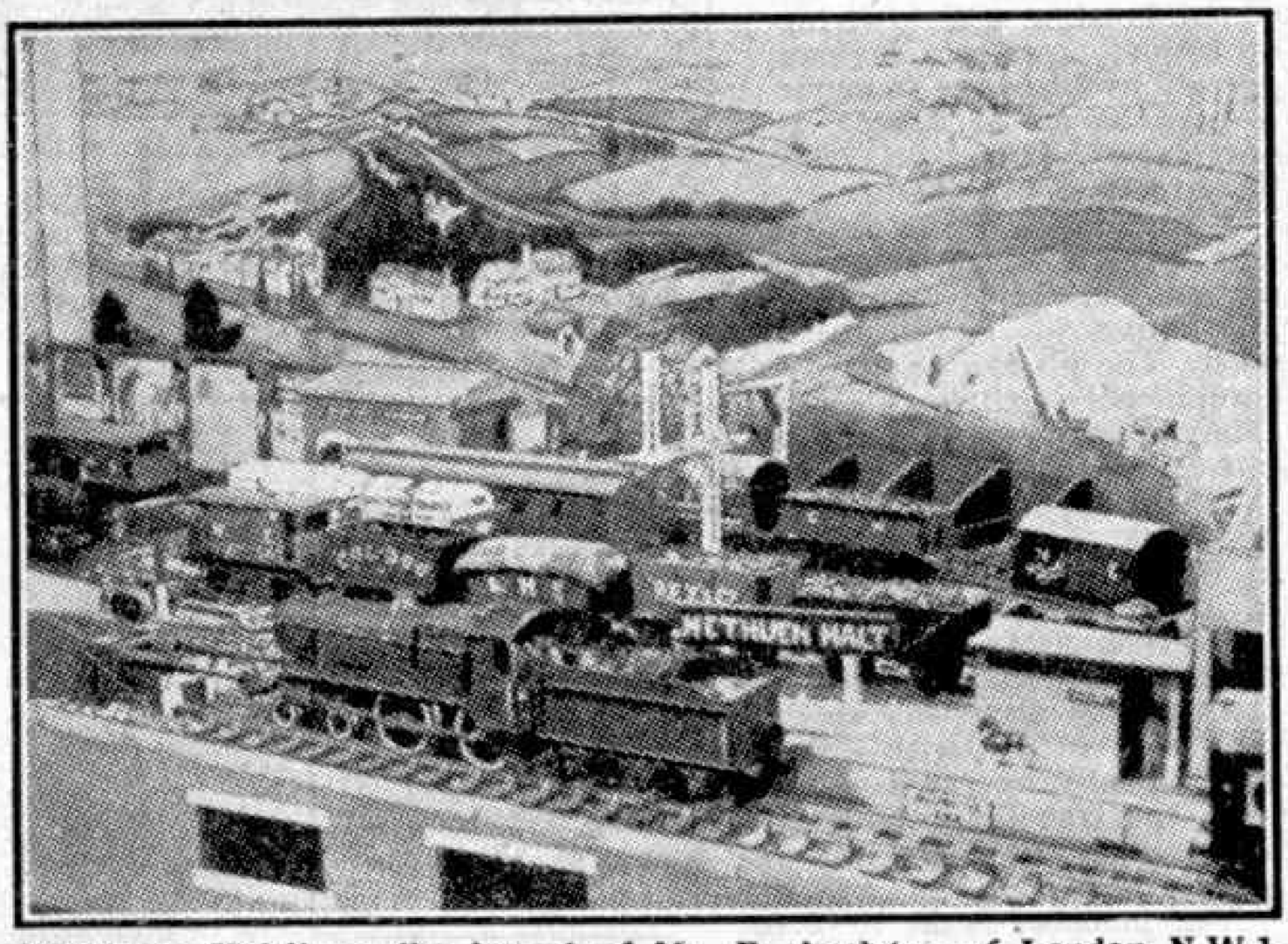
The machine is fitted with a bucket having a capacity of 25 cub. yd., which is capable of removing 37 tons of earth at one "bite" and then depositing it at a distance of 350 ft. from the point where it was excavated. The machine is at work in a surface coal area, and is used for removing earth and rock overlying the coal deposits.

Notes from a Reader's Layout

The "Methuen Park Railroad"

IN the June 1943 "*Meccano Magazine*" there appeared an article dealing with the "*Methuen Park Railroad*" of our reader Mr. F. Appleton of London N.W.1. The name "Railroad" does not imply an American system, but is simply preferred by the owner. We give on this page a few notes on the present state of the railway.

Since the previous description appeared the system had to be uprooted wholesale to allow of house repairs being carried out after the unwelcome attention to the neighbourhood of rockets, bombs and other missiles. The necessity for relaying the system has proved something of a blessing in disguise. Owing to the transfer of the line to another room, greater space became available than before, and the owner and the Engineer immediately made the most of this unusual opportunity. In its general plan the system has not been altered but, as the line is laid with miniature permanent way, advantage has been taken of the increased area to relay the original sharp curves. This has greatly improved the running possibilities to the full benefit of the Hornby 20-volt "*County of Bedford*" locomotive that forms the principal motive power unit.



"Methuen Halt" on the layout of Mr. F. Appleton of London N.W.1. The background scenery gives a remarkable effect of depth.

An oval main line is still employed and there is as yet only one station. This bears the name "*Methuen Halt*" and part of it and the yard beyond appear in the illustration. The main line is single, but a loop is available through the station on one side. The main line serves one side of the island platform while the other side accommodates the dead-end road terminated by the buffer stops shown in the illustration.

Between the station and one wall of the room, on which a most realistic scenic background is provided, there lies a busy set of sidings. These are on a more extensive scale than previously and they have become necessary if only to accommodate the growing number of goods vehicles, some of home construction. The sidings run into the corner of the room at one end, while at the other end of the yard the corresponding corner is made use of for the "Locomotive Department." An engine shed and turntable together with an engine line occupy most of this space. When the turntable is in its normal position it also provides access to a small "dock" or goods platform used for milk and similar traffic.

The Hornby "*County of Bedford*" works expresses of Pullman, saloon and other bogie vehicles. Fast freight trains including milk tanks, refrigerator vans and among other items a home-built horse-box, also are included in its range of duties.

Signals of various kinds are in use, some of the upper-quadrant and some of the older lower-quadrant pattern. In addition colour-light signals have been installed here and there. Their red and green aspects add considerably to the realism of operations, and the general effect is helped a great deal by the provision of lighting of the railway and many of the lineside buildings. Of the latter a recent addition is a row of neatly-modelled Tudor buildings. These give quite an old-world atmosphere to the surroundings of the layout and are in sharp contrast to the modern motor vehicles seen on the local roads.

Of General Interest

An Ingenious "Pole Mounting" Transformer

The spread of electricity supply lines in country districts has made a "pole-mounted" transformer a very familiar object. These useful pieces of equipment can be seen near most villages, and form vital links between the great power stations and the smaller places which draw their current from the distribution mains.

Most of these transformers are very similar to the larger ones used for big out-of-doors sub-stations, and are enclosed in metal cases, but a type of pole-mounted transformer recently introduced has specially interesting novel features. Its case is of glazed stoneware, a material which seems very suitable for a transformer that has to operate in exposed conditions in every kind of weather, for it is a good insulator and needs no painting, as it is waterproof and not subject to corrosion.

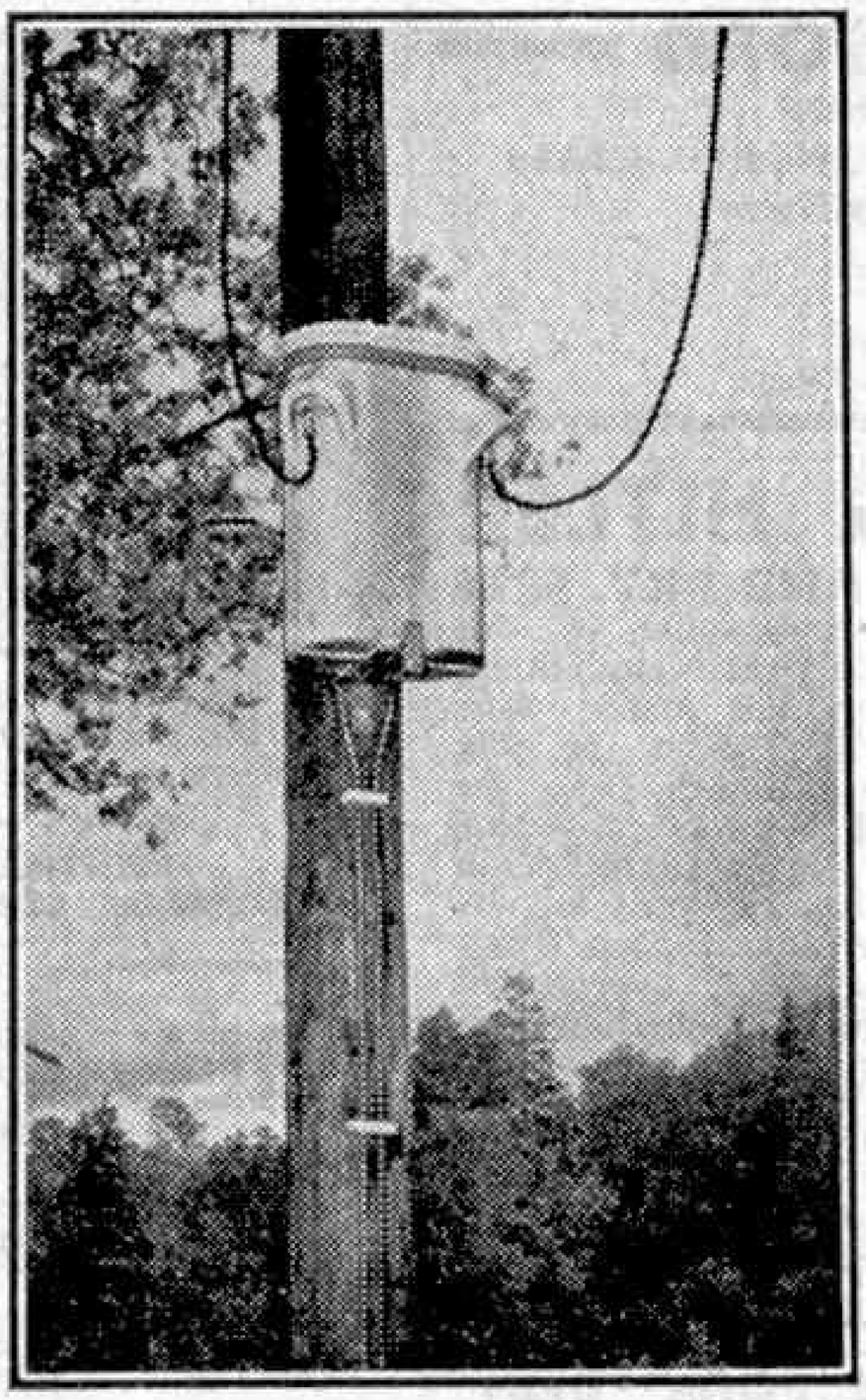
The illustration on this page shows one of these transformers mounted on a pole in a rural area. It will be seen that the stoneware case is really a kind of earthenware tank, which completely encloses the core and windings and serves to contain the oil in which they are immersed. The cover of the container also is of stoneware. It is secured by six studs and nuts, and the joint is sealed by a special gasket and cement, a method that makes the transformer quite oil and damp proof.

Shaped weather cowls, moulded as a part of the casing, give protection to the high tension terminals, and domed insulators are fitted to the low tension terminals to minimise leakage at these points. The design of the terminals themselves allows connections to be made without opening up the case, so that moisture cannot enter in this process.

The complete transformer is mounted in a steel cradle, which has a sturdy bottom support, to take the weight of the transformer, and a heavy channel girder at the back to give firm attachment to the pole. Lifting hooks are fitted as a part of the cradle, and erection is simple and rapidly performed.

The transformer has been designed to provide a simple and standardised unit for rural electricity distribution systems which will require little if any maintenance, and which can, as far as possible, be just fitted and forgotten. It is made by the British Power Transformer Co. Ltd. of Ponders End, Middlesex.

T. R. ROBINSON.



The pole-mounting transformer described on this page. Photograph by courtesy of the British Power Transformer Co. Ltd.

Covered Railway Bridges

Covered wooden railway bridges last century were a common sight in the United States. There were more of these in the New England states of the east than in any other part of the country. The reason for this was that there were formerly many small railways in that region, while in addition there was plenty of timber that could easily be reached and the necessary labour to build the bridges was plentiful.

Half a century ago the Boston and Maine Railroad had more than 50 covered bridges, and there are still seven in existence, all on branch lines in New Hampshire. Four of them are in pairs on one branch within a distance of 50 miles. Two of these were built in 1849–50 and the others in 1871–72, and all were rebuilt about the turn of the century. Three of them have two spans, while the fourth consists of a single span with an arch.

These bridges were given their roofs because the bridge builders of the era of their erection found uncovered spruce bridge timbers would last only about eight years in the severe climate of New England. They lasted several times as long when they were given protection by a shingled or tarred paper roofing. In this respect the New England covered bridges differ from the famous Britannia and Conway tubular bridges of Robert Stephenson. These were really hollow beams with upper members that contributed to the strength of the structures, and were not there merely for protection.

An Animal Trader

One of the strangest of all animals is the pack rat of North America. Another name for it is the trade rat, a name that it gets because it believes that fair exchange is no robbery. It is an inveterate thief, carrying off anything that it can reach, but it probably does not regard this as theft, for it always leaves some other object behind. Its idea of a fair exchange seems strange to us, however, for it replaces food and even knives, forks and spoons it carries off by sticks and worthless material of all kinds. Trading or store keeping seems to be born in this creature. When there are no human beings near it makes great piles of odds and ends, even mere stones, apparently in readiness for exchange.

A Squirrel Migration

Equally strange in another way is the lemming, an arctic member of the mouse or rat family, which changes colour with the seasons. It is snow white in winter and brown in summer. The migrations of the lemming are well known. Suddenly it appears in vast hoards that travel across the land, eating the fields bare, until they reach the sea, into which they plunge and drown. Other creatures besides lemmings sometimes appear in enormous numbers and set out on a journey that seems to have no idea behind it. For instance, a hoard of grey squirrels once descended on New York City, all scurrying westward. Nothing could stop them. They ignored traffic, to which many fell victims, and swarmed through the city and across the Hudson River, some over the George Washington Bridge, others on the crowded ferry boats and still others swimming across the river itself. For several days indeed there was a steady stream of grey squirrels across the city. These all seemed to be strangers to New York, for afterwards the number of those in the parks and ways about the city continued very much as before.

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For other Stamp Advertisements see also pages 178 and xi.

Stamp Collecting

South Africa before the Union

By F. Riley, B.Sc.

AFTER Mauritius our next call in our stamp tour of the Empire is made at Cape Town. This is the obvious place for the beginning of a stamp journey through South Africa, as it was the first place to be settled by Europeans. The Portuguese were the pioneers of the sea route to South Africa and beyond to India, but it was the Dutch who followed who settled there. Dutch colonisation began soon after 1652, and it was not until 1806 that the Cape became a British colony.

By that time there were 27,000 Dutch settlers, and a century or so later the number of Europeans had increased to nearly 1½ million, of whom nearly half were British. Through that period there had been constant rivalry between the two races, who remained separate nationalities, and finally fought each other for the mastery of the country. Now all that is ended. The whole of South Africa is united under its own Government, and forms an important part of the British Commonwealth of Nations.

The stamp story of South Africa begins with one of the classics of stamp collecting—the famous "Cape triangular." It was not until 13 years after the appearance of the British "Penny Black" that a stamp was issued in South Africa, and it was suggested that there should be a difference in shape, in order to avoid the possibility of confusion. The shape chosen was certainly distinctive enough. Other countries have since produced triangular stamps, but the Cape trianguiars are still the outstanding examples of this type. Stamp collectors dream of acquiring them, particularly the "Wood-blocks" of 1861, which were produced in South Africa and are scarce and highly priced, especially in mint condition. There were two of them, 1d. vermilion and 4d. pale milk blue.

The design of the first Cape stamp, illustrated here, was very simple, consisting only of a figure of Hope, the emblem of the Cape, with the appropriate wording. "*Hope*" continued to be the chief feature of the design for many years, a reminder of the feelings of Bartholomew Diaz, whose hopes of finding a way to the rich spice lands of the east were realised when in 1888 he rounded the promontory to which he gave the name of Cape of Storms. This was later changed to the Cape of Good Hope. In later designs a grape vine branch and a representation of a ram were added to typify the products of the country.

Portrait stamps appeared in the reign of Edward VII, but prior to this, in 1898 and 1900 respectively, two interesting pioneer pictorials were issued. These showed Table Bay, and Table Mountain, the great flat-topped rocky mass that dominates the city and the Bay. The first of the two stamps retained the figure of "*Hope*," with a view of Table Bay in the background, while the second, reproduced on this page, shows the mountain and the Bay, with the arms of the colony above.

While the Cape was developing there were independent settlements in other parts of the country, notably in Natal on the shores of the Indian Ocean. The stamp story of this part of South Africa began only four years after that of the Cape, with the issue of a very fine portrait stamp, and portrait stamps continued to be the rule right through the separate existence of the country.

Before we go further we must turn for a moment to the struggles between the Dutch and the British under whose control the country had come. The Dutch farmers, or Boers, were determined to preserve their independence, and in 1835 10,000 of them, men, women and children, packed their possessions into their huge ox-wagons and drove northward, taking their cattle and sheep with them, across the Orange River. They formed settlements there, and also beyond the Vaal, and these eventually became the Transvaal and Orange Free State Republics.

Each of these countries later came to issue its own stamps. The Orange Free State stamps show an orange tree in fruit, a very simple design. The Transvaal issue bore the arms of the republic, a design that continued to be used in various forms until the Boer War, which broke out at the end of the last century and continued until British dominion was established. It was during this war that the "Baden Powell" stamp was issued in Mafeking, which underwent a prolonged siege by the Boers. Typical British stamps were later introduced. The first of them in the Orange Free State, which appeared in 1903, was a very interesting design, for it pictured a scene in which were a springbok and a gnu.

Happily the differences that led to strife in South Africa were brought to an end some years later, when the four countries concerned were united and given self-government, with the status of a Dominion. The Union of South Africa came into being on 31st May 1909, and since that time the country has been at peace, except for the efforts of a few extremists who wished to join hands with the Germans in South West Africa in the early days of the 1914-18 war.

With the coming of the Union there was a new start in the stamp story of South Africa. The issues of this new era have included many fine pictorials, some of which illustrate high lights of the famous trek northward of the Boers who resolved to maintain their independence, and of their struggles with fierce native tribes and nations.

The existence of two races side by side in the Union has led to a striking feature of South African stamps, the use of two languages in the inscriptions. One of these is Afrikaans, a variant of Dutch, the language of the original settlers, and since 1926 South African stamps in general have been issued in sheets on which English and Afrikaans are used alternately. Thus adjoining stamps on a sheet are inscribed "*South Africa*" and "*Suidafrika*," and for this reason the stamps of the country are best collected in pairs. An exception was a triangular 4d. stamp of 1926, which had English and Afrikaans on separate sheets.

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CAPE OF GOOD HOPE. 1d. ea. 48A, 49A, 58, 58A, 59A, 67, 69, 70, 71. **4d. ea.** 50, 61, 72, 74, 75. **6d. ea.** 52A, 57, 76, 77. **1/- ea.** 30, 40A, 51. **1/3 ea.** 25B, 55A. **2/6 ea.** 24A, 26A. **3/- ea.** 39, 46, 68, 73. **4/6 ea.** 54.
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NEWHAVEN, GLYN AVENUE, COLWYN BAY

For other Stamp Advertisements see also pages 176 and xi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

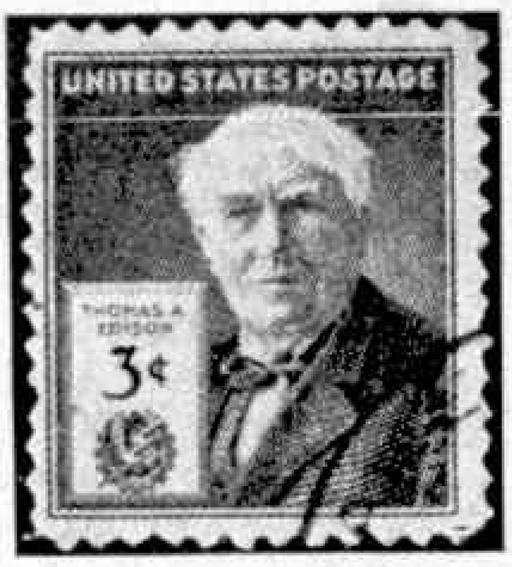
COLLECTORS of King George VI stamps are having the time of their lives just now, with an abundance of new issues, none of them costing more than the average collector can afford to pay. No doubt the most popular sets of all are those issued by Basutoland, Bechuanaland and Swaziland for the Royal visit to their territories. Those of South Africa and South West Africa were attractive enough, but this business of having to collect them in pairs is a positive nuisance, particularly when the stamps are oblong, as in the present case. There is a strong philatelic society in South Africa, and if they could prevail on the postal authorities to cut out this bi-lingual business on their stamps, they would indeed have done a good job of work, a much more useful act than suggesting that a competition should be held to allow the public to submit designs for their new stamps.

To give everybody a chance to compete sounds very well on paper, but the actual result is never a success. Most of the poor designs one sees are the result of amateurish efforts. The designing of such a small thing as a postage stamp calls for specialized skill of the highest order, skill that the amateur rarely possesses.

Australia is another country which proposes to bring out a new set, with designs selected from those submitted by the public. It will be very interesting to see how they turn out; not that it won't be easy to beat anything which Australia has issued up to the present. One of the poorest stamp designs ever was that used by Australia in 1913, which persists to this day, the last stamp being the 2/- value. Yet these stamps are exceedingly popular in Australia, and some of the mint bring high prices. Of course they are scarce enough, for outside Australia collectors, repelled no doubt by the shoddy appearance of the stamps, would have no truck with them. Many of them probably wish now that they had.

A collector was asking the writer the other day what had happened to the stamps of Papua and New Guinea, and what kind of stamps they were using to-day in these territories, now that the Japs had been driven out. Well, it is understood that all the stamps were safely removed before the Japs moved in, and that they are still extant in Sydney, which is the reason why some collectors are rather afraid of buying those available at present high prices. They are certainly high. The New Guinea air set to £1 issued in 1939 brings £16 at auction, and this would go down with a bump if stocks held in Australia were ever placed on sale. At the present moment Australian stamps are being used, and it is only by postmarks that one can tell which stamps have come from the countries in question.

There is another interesting point about Australian stamps. They are used in Japan by Australian military forces, and they have recently been overprinted "BAOC Japan." Of course collectors are keen to get hold of copies, and British dealers, ever quick on the uptake, were soon cabling to Australia G.P.O. to see if they could obtain supplies. The reply has been received that the stamps are only for use of Australian troops in Japan; nevertheless used copies will be available and they should be well worth acquiring.



There is a rather interesting point about the South African Royal visit stamps. There was a last minute change in the design of the 3d. value. It was found that the plant depicted at each side of the stamp was not indigenous to South Africa, so this has now been replaced by one about which there are no patriotic doubts.

Another stamp of interest, which we hope to illustrate next month, is the new Canadian 4 c. issued to commemorate the birth of that grand Scot Sir Alexander Graham Bell, the inventor of the telephone. The Americans have already claimed him as a "Famous American" and shown his portrait on a stamp of a series honouring their great men. Now it is Canada's turn. Actually Bell was 23 years old before he ever saw Canada, and older than that before he went to the United States. It was found that he died and was buried in Canada, so all was well, and here we have an attractive stamp in honour of that American-Canadian Scotsman, who benefited the whole world with his invention.

The continent continues to pour out new stamps, and while many of them may be anything but an investment, the writer for one cannot resist the beauty of some of them. Austria recently issued a set to raise funds for restoring the Viennese cathedral of St. Stephen. The set comprises 10 stamps. Each depicts some portion of the cathedral, and for sheer beauty this set could not be beaten. If stamp collecting inspires such work it more than justifies its existence. The stamps are line engraved, and when one compares them with our commemorative stamps, such as the recent "Victory" issue, one cannot help being ashamed of our own efforts.

The United States are making a great todo about the forthcoming centenary of their first postage stamps. Whatever one may think of their modern stamps, there can be no two opinions regarding their old line engraved issues. They are superb, and the stamp we are illustrating, one recently issued in honour of Edison, puts up a very poor show in comparison. Incidentally, to commemorate the postage centenary the American Post Office is going to issue a miniature sheet.

New Zealand is bringing out a new set similar to the stamp we are illustrating. The top value will be 3/-, and all the pictorials will be withdrawn.

As for the tip of the month, try to get a mint copy of the 1½d. brown stamp of New Zealand, similar to the one we are illustrating.

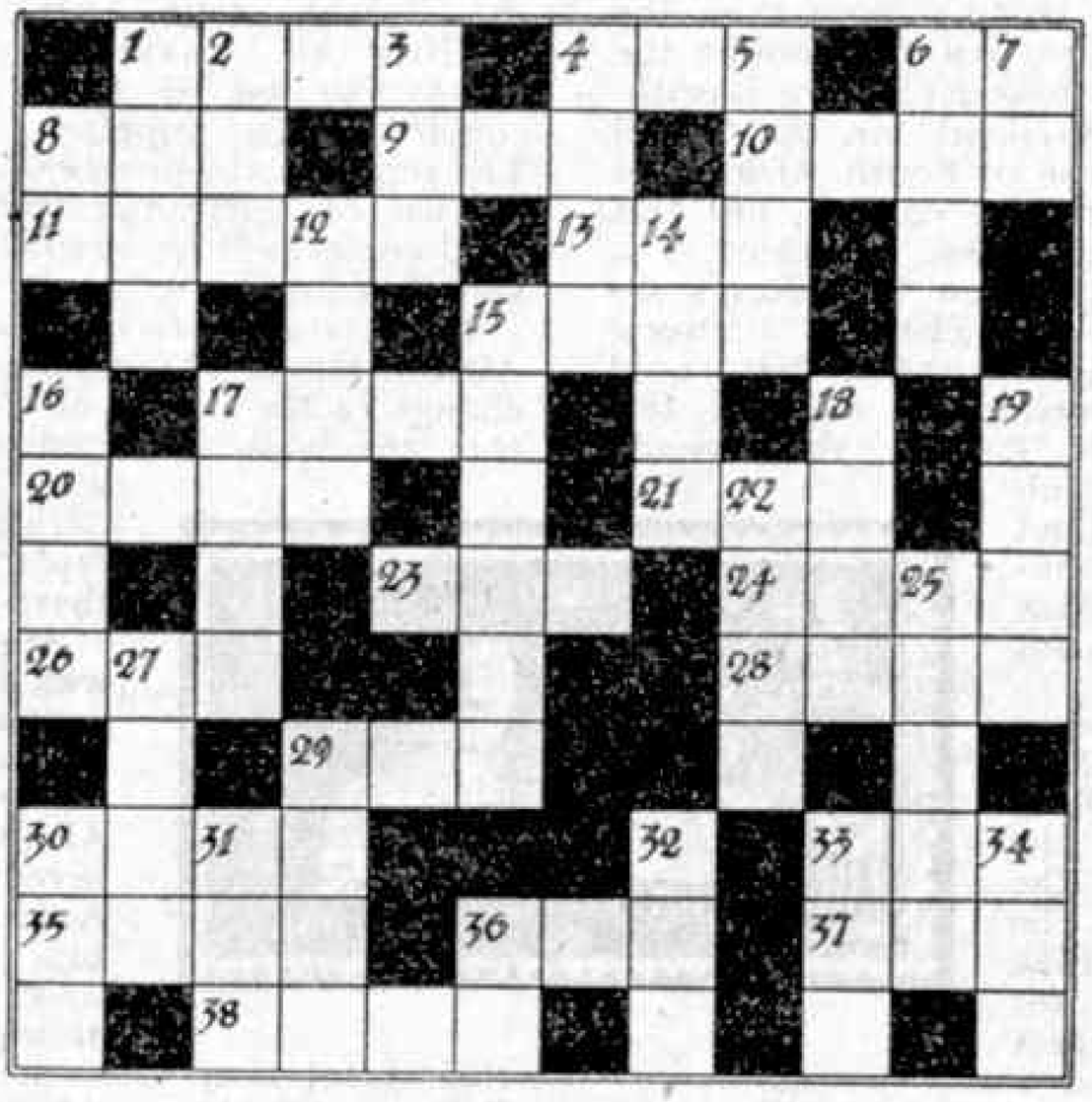
Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Locomotive "Cross-Number"

CLUES ACROSS

1. Fast and ——?
4. Pattern of Knighthood
6. I.O.W. village
8. An S.R. "Z" class engine
9. Shakespeare's county
10. Rocket builder
11. 902 fought here
13. A famous admiral
15. A knocker-up
17. Capital of Ceylon
20. A Planet
21. Group of trees
23. Darkened sun, for example
24. Alice not in Wonderland
26. Another famous admiral
28. Fish-eating bird
29. Largest county
30. Long-legged bird
33. A Scottish Shire
35. "*Princess Helena Victoria*"
36. Not the up side
37. Nothing to do with a camel
38. A Berkshire "Manor"



CLUES DOWN

1. Mona
2. "*Insult*" is a possible nickname
3. Surrey Town
4. A woollen garment, and a castle
5. B.S.A. bicycles are made here
6. "*Recovery*"
7. I.O.W. 'stone' village
8. Near le Havre
12. "*Ironside's*" class
14. "*Belmont Hall*"
15. Gloves are made here
16. Public school
17. Toffee lady?
18. Sussex cape
19. A G.W.R. 49 "Hall"
22. Tank ending in five
25. A dog
27. Ireland
29. Scott novel
30. Bomber County
31. "*Pendennis Castle*" shortened
32. He fought in 5073
33. This 'Hunt' ends in 7
34. Three quarters of "*City of London*"
36. Norman seaport

This month we present readers with another of the popular locomotive "cross-number" puzzles. This resembles the familiar crossword puzzle, but the clues lead to locomotive numbers that fit in with each other, horizontally and vertically, in exactly the same manner as do the words of a crossword.

For example the solution to the clue 1 across is "*Furious*," the name of L.M.S. locomotive No. 5729, and it is this number that is used to fill the four squares. Where L.N.E.R. engines are concerned, the numbers carried by the engines before the present nearly completed renumbering scheme are used.

The competition, which is the work of our reader, R. Beament, Tunbridge Wells, is divided into the usual two sections, for Home and Overseas readers respectively, and there will be prizes in each section to the value of 21/–, 15/– and 10/6, with consolation prizes for other deserving efforts. Neatness and originality will be taken into account if there is a tie for any prize.

Envelopes containing entries should be addressed to "*April Locomotive Puzzle, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st May; Overseas Section, 29th November.

Engineering Structures in Hiding

Our puzzle this month concerns bridges, canals, tunnels and dams. The names of 10 of the most famous of these have been hidden in the simple sentences below and entrants are asked to find them.

Here are the 10 sentences.

1. It was all done for the best.
2. The black wall of night has descended on us again.
3. What is the best protection for a swimmer's eyes?
4. Hasn't marzipan a marvellous flavour?
5. A blunt knife will sever no wood.
6. It would require a powerful tug to tow Eric's boat here.
7. He used some nails in making a box.
8. The river level has not fallen or risen since last week.
9. Did he cross the Atlantic in the "*Georgic*" or in the "*Britannic*"?
10. He is not at all athletic, as cadets usually are.

To make it quite clear what is required we may take the first example. The fifth word is "for" and the two first letters of the next word are "th." Together these make up the name "Forth," that of the famous Scottish bridge across the Firth of Forth.

There are the usual two sections in this contest, for Home and Overseas readers respectively, and in each there will be prizes of 21/–, 15/– and 10/6 for the best entries in order of merit. Consolation prizes will be awarded for other good efforts. In the event of a tie for any prize the judges will take account of neatness and novelty.

Entries should be addressed "*April Hidden Names Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 31st May; Overseas Section, 29th November.

April Photographic Contest

This month's contest is the 4th of our 1947 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed: "*April Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Overseas readers, and in each section prizes of 15/– and 7/6 will be awarded. Closing dates: Home Section 30th April; Overseas Section, 30th September

Competition Results and Solutions

HOME

SEPTEMBER PHOTOGRAPHIC CONTEST

1st Prizes, Section A: G. Ogilvie, Edinburgh 4; Section B: C. R. Brown, Hove 4. 2nd Prizes, Section A: W. Barr, Birkenhead; Section B: A. Lewis, Cardiff. Consolation Prizes: G. Gemmill, Burnley; P. F. Winterburn, Ossett; J. E. Turley, Tunbridge Wells; N. V. Salt, Manchester 20; J. Berry, Bristol; F. W. Wilkes, Birmingham 31; C. E. Fitzer, Orpington; R. H. Deakin, Shrewsbury; H. Holmes, Harwood; A. T. Hughes, Bristol 4.

SEPTEMBER SIGNALLING STORY

1st Prize: C. E. Wrayford, Bovey Tracey. 2nd Prize: G. M. Pink, Knebworth. 3rd Prize: D. J. D. Gilbert, Bromley. Consolation Prizes: A. Mathew, Peterborough; B. J. Holden, Burgess Hill.

SEPTEMBER POINTSWORD

1st Prize: B. A. Mitchell, London S.W.19. 2nd Prize: E. P. Kingdon, Exeter. 3rd Prize: T. J. Smith, Diggle, Nr. Oldham. Consolation Prizes: L. Burt, Letchworth; C. E. Wrayford, Bovey Tracey; A. Stewart Glasgow E.1.

OCTOBER PHOTOGRAPHIC CONTEST

1st Prizes: Section A: G. L. Coulter, Bangor; Section B: T. Borgman, Bishops Stortford. 2nd Prizes, Section A: W. Barr, Birkenhead; Section B: R. W. Ricketts, Oundle. Consolation Prizes: G. Ogilvie, Edinburgh 4; C. A. Reader, London S.W.18; F. Mills, Kearsley; J. E. Turley, Tunbridge Wells; B. K. Thomas, Grimsby; A. S. Lawrie, Mapperley Park; D. R. Kirby, Ewell; R. Jones, Bethesda; G. R. Brown, Hove 4.

OCTOBER "LOCOMOTIVE" CONTEST

1st Prize: R. A. Burningham, Redhill. 2nd Prize: C. E. Wrayford, Bovey Tracey. 3rd Prize: A. Southerton, Redditch. Consolation Prizes: D. J. Dean, Norwich; B. Bulstrode, Christchurch; P. C. Perkins, Edgware.

OCTOBER "ENGINEERING DRAWING" CONTEST

Section A, 1st Prize: J. Ferris, Edinburgh 9; 2nd Prize: K. R. Pargeter, Stourbridge; 3rd Prize: M. Cornes, Widnes. Section B, 1st Prize: D. Warner, Kineton; 2nd Prize: K. Daies, Lincoln; 3rd Prize: N. Birch, Wolverhampton. Consolation Prizes: Section A: B. C. Chapman, London E.11; P. J. Fells, Tring. Section B: D. Aston, Worcester; J. Reid, Aberdour, Scotland.

NOVEMBER CROSSWORD

1st Prize: A. Smedley, Swinton. 2nd Prize: H. Poyner, Leicester. 3rd Prize: A. G. Hicks, Ashby-de-la-Zouch. Consolation Prizes: F. Mills, Kearsley; E. Warwick, Wakefield; G. Ogilvie, Edinburgh 4.

NOVEMBER ENGINE CLASS CONTEST

1st Prize: B. Carter, Shipley. 2nd Prize: G. Ogilvie, Edinburgh 4. 3rd Prize: E. Taylor, Three Bridges. Consolation Prizes: L. Wilkinson, Fulwood; D. W. C. Mayhew, Braincote; R. W. Tringham, Sudbury.

NOVEMBER PHOTOGRAPHIC CONTEST

1st Prize, Section A: R. Wrigley, Clitheroe; Section B: N. Boyd-Maunsell, Oxford. 2nd Prize, Section A: W. Barr, Tranmere; Section B: D. Jones, Bridgend. Consolation Prize: B. J. Ellam, Long Eaton

OVERSEAS

MAY "HIDDEN LOCOMOTIVES" CONTEST

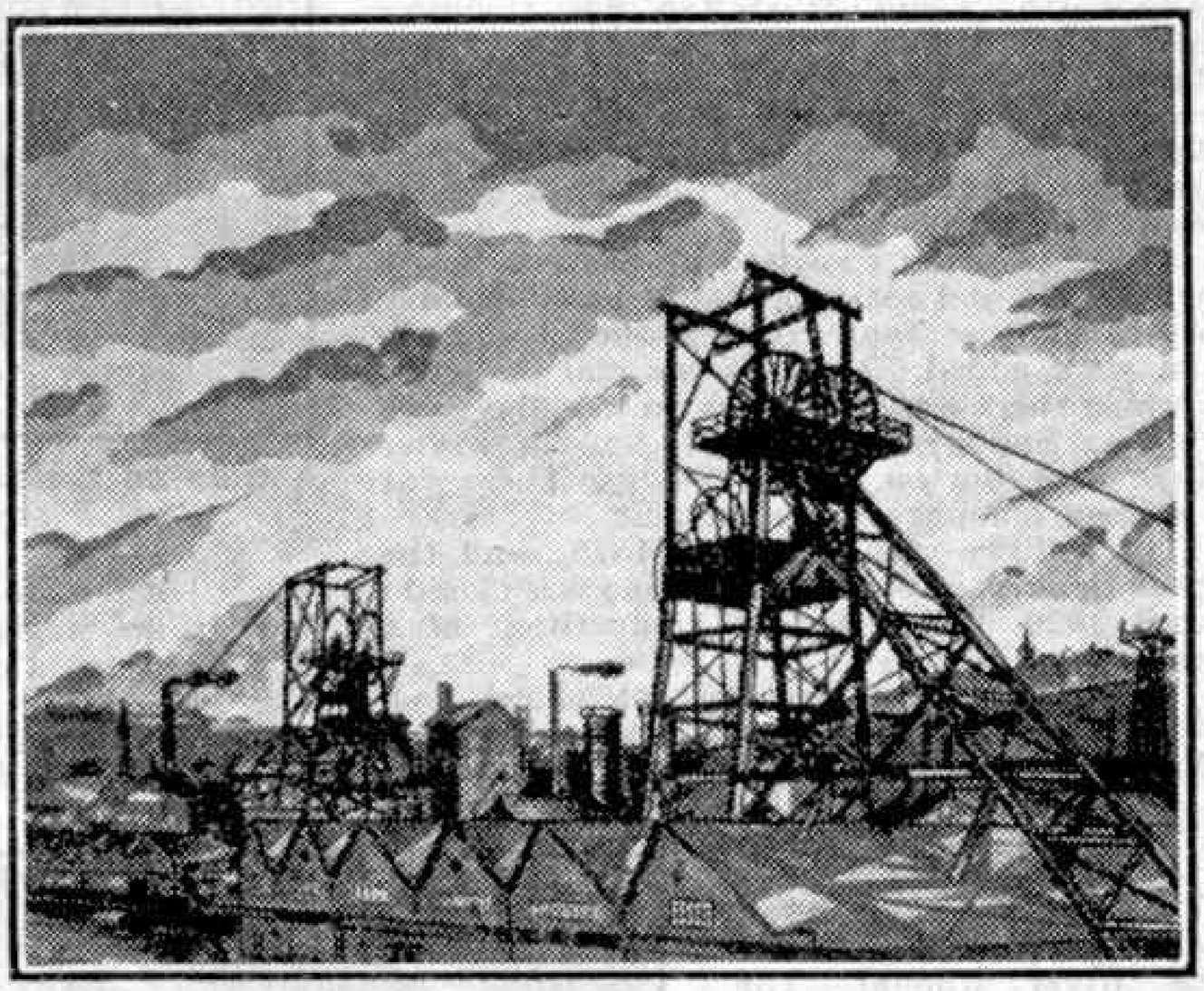
1st Prize: B. L. Cottrell, Paris, France. 2nd Prize: J. Hewitt, Valetta, Malta, G.C. 3rd Prize: F. H. Tudor, Valparaiso, Chile. Consolation Prizes: J. T. B. Johnstone, Wellington, C.I., N.Z.; Pablo Giese, Buenos Aires, Argentina.

JUNE "STATION NAMES" CONTEST

1st Prize: D. J. White, Christchurch, N.1, N.Z. 2nd Prize: Jos. M. Demanuele, St. Julian's, Malta, G.C. 3rd Prize: Miss Emelda Gnanadurai, Trichinopoly, India. Consolation Prizes: J. A. Gnanadurai, Trichinopoly, India. G. W. Longley, Port Elizabeth, S. Africa.

JUNE "CODE PUZZLE"

1st Prize: G. T. Dey, Hamilton, N.Z. 2nd Prize: B. Lathlean, Westmead, N.S.W. 3rd Prize: L. R. Dixon, Pretoria, S.A. Consolation Prizes: R. Berger, Leysin-Village, Switzerland; Lim Kwang Hua, Selangor, Malaya.



"Sundown." An excellent coloured drawing by K. R. Pargeter, Stourbridge; a prize-winning entry in the October 1946 Engineering Drawing Contest.

AUGUST RAILWAY QUIZ SOLUTION

1. A coach detached from the rear of an express train by means of special couplings and brake gear, without stopping the main train.
2. L.P.T.B. (Metropolitan line) and L.N.E.R. (G.C. Section), Canfield Place to Harrow South.
3. An American brake van for freight trains.
4. The arrangement of mechanical and sometimes electrical "locks" so that conflicting movements of signals and points cannot be made.
5. A rail braking device normally operated in conjunction with hump shunting, operated on the wheels of freight vehicles in order to slow them down. First used in Great Britain at Whitemoor yard, March. L.N.E.R.
6. 1927.
7. The L.M.S.R.
8. Bradford, Leeds, Torquay and Paignton via Bristol.
9. Simplon.
10. L.N.E.R., 126 M.P.H. in 1938

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

THE SOUTHWOLD RAILWAY

Until 1929 there was between Halesworth and Southwold, in Suffolk, a light railway of 3 ft. gauge called the Southwold Railway. There were four tank locomotives in service, three with the wheel arrangement 2-4-0 and one 0-6-2. These were named after towns which the railway served. Nos. 1, 2 and 3 were "*Southwold*," "*Halesworth*" and "*Blyth*." No. 4, the 0-6-2 tank, was "*Wenhaston*."

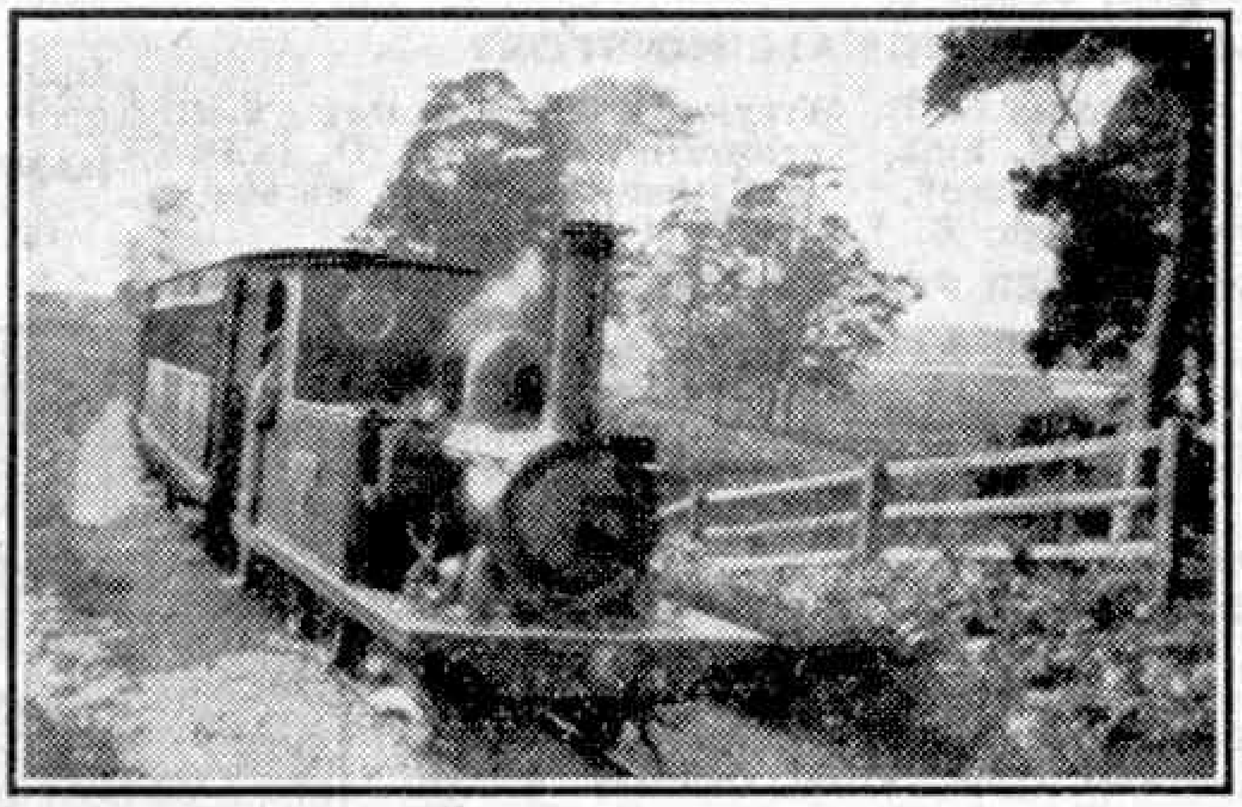
The railway consisted of a single track line, about eight miles in length, beside the marshes of the river Blythe. It started from Halesworth, where its station was alongside that of the L.N.E.R. (G.E.R.). Then it ran through the villages of Wenhaston and Blythburgh, where there was a passing loop, to Walberswick, where there was a swing bridge across the Blythe, and on to the seaside holiday resort of Southwold.

A normal train consisted of two coaches, a luggage van and coal trucks, but in the holiday season another four coaches and a luggage van were added. Towards the end of active working there were six trains on weekdays and four on Sundays in summer, and in winter there were four on weekdays only. There was a certain amount of goods traffic.

The railway was opened in 1879, and the speed limit was 16 m.p.h. The line was closed on 11th April 1929, owing to the competition of the bus services.

The accompanying photograph shows one of the 2-4-0 tanks, hauling a train, between Blythburgh and Walberswick.

J. C. MARWOOD (Wembley).



A train on the Southwold Railway, now closed. Photograph by J. C. Marwood, Wembley.

THE RHONE GLACIER MYSTERY

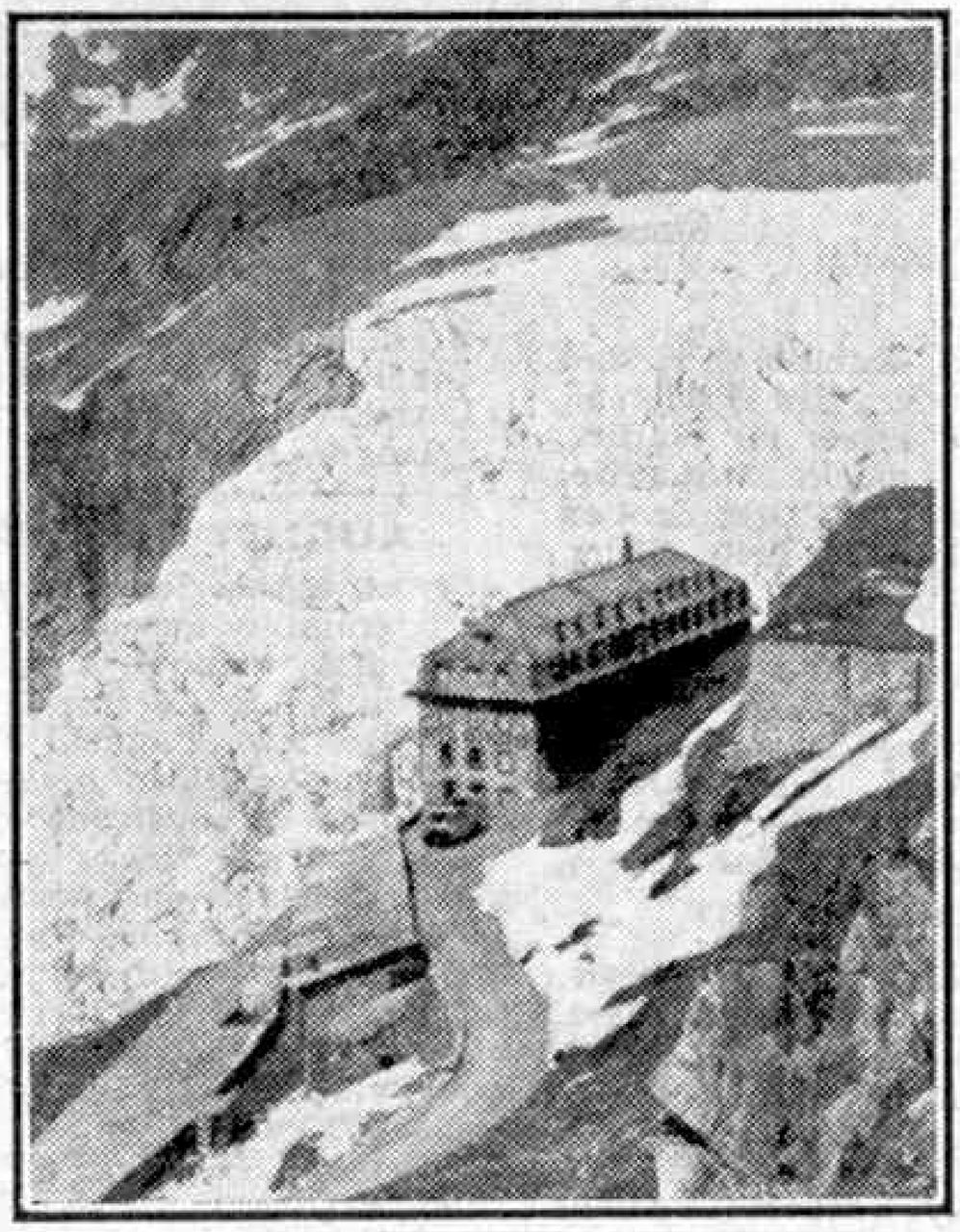
Is this tremendous icefall actually the source of the River Rhone? The thousands of travellers who yearly made its acquaintance in pre-war days are convinced that it is, but in the village of Gletsch at the foot of the glacier I heard a different story. Local people are insistent that the river is born in three small springs that unite at the foot of the Maienwald mountain, a considerable distance from the glacier. They call them the Rotten, and in a short distance they join the main stream flowing from the glacier.

What is most remarkable is that despite the snow and ice, which persists here at a height of more than 5,000 ft. for almost eight months of the year, the temperature of the springs always remains between 60 and 63 deg. F.

Despite this doubt of its importance as the source of a great river, there is no disputing the attraction of the Rhone Glacier, for it is considered the most beautiful in Switzerland. It is easily the most accessible, affording the most reluctant adventurer the opportunity of inspecting an icefall at close quarters. Most glaciers lie at the head of remote valleys, but this climbs down from the sky like a gigantic staircase between two famous road passes, the Grimsel and the Furka, both nearly 8,000 ft. high.

From the Hotel Belvedere, which is almost suspended over the dull ice, parties leave to explore the crevasses and fissures of the glacier, and for those who care to probe even deeper, passages and caves have been hewn out of the solid ice, stark electric lights illuminating a dank dripping world.

R. R.-BUSHELL (Belfast).



The Rhone Glacier. Photograph by R. R. Bushell, Belfast.

IRISH ROUND TOWERS

In Ireland there are about 80 round towers, of which 20 are still complete. They vary in height from 60 to 150 ft., are from 13 to 20 ft. in external diameter at the base, and slope gradually upwards to a conical top. In each there are six or seven stories, each reached by a ladder from the one below it, and the only entrance is a door about 10 ft. above the ground, also reached by a ladder.

It has now been established that the round towers were built between the 9th and 13th centuries. This is borne out by the fact that all of them are to be found very near the ruins of ancient Irish churches or monasteries.

C. V. OAKLEY (Birr).

Fireside Fun

Self-made Man: "Yes, I was left an orphan at the age of 10 months, and have had to shift for myself ever since."

Bored Listener: "How on earth did you do that at the age of 10 months?"

Self-made Man: "I crawled to a baby show and won first prize."

• • • •

"How is John getting on at school?"

"Oh, splendid. He has learned a quick way of counting sheep now."

"How does he do that?"

"He counts their legs and divides by four."

• • • •

"I say, the sleeves of this coat you made me are miles too long."

"Sorry, sir. I shall put that right, of course. How much shall I take off them."

"Oh, I think half an inch will do."

• • • •

A country boy in town for the first time in his life bought his ticket at the pay box of the picture house and went inside. He came out almost immediately and repeated the performance. Then he came out again.

"Say, what's the idea?" asked the attendant in astonishment. "This is the third time you've come here for a ticket."

"Can't help it," was the reply. "As soon as I get inside they tear my ticket in two. Give me a proper one this time."

• • • •

"You'll have to pay for that boy, ma'am."

"I'll do nothing of the kind."

"How old is he?"

"I don't know. I've never seen him before."

• • • •

THIS MONTH'S HOWLER

A fugue is what you get in a room full of people with all the doors and windows shut.

BRAIN TEASERS
WHAT RELATION IS HE?

Recently a small boy informed me that he had just discovered that his aunt's brother was not his uncle. For a moment I was surprised, but I was soon able to say who this mysterious individual is. Can you do this in five seconds?

• • • •

"Such pains in my arms, Doctor, I can hardly lift them above my head, and the same with my legs!"

• • • •

ADD A LETTER EACH TIME

The following clues point to a series of words of 2, 3, 4, 5, 6, 7 and 8 letters respectively, and each word contains the letters of those that go before, with another letter added. What are the words?

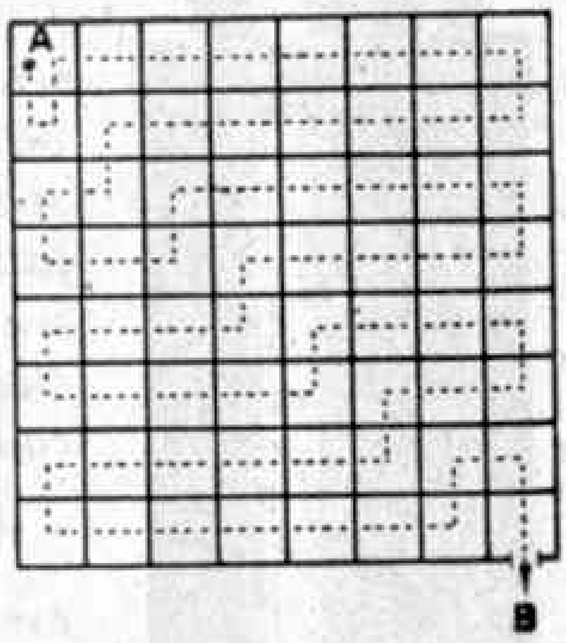
1. A metal has lost its head.
2. Relationship.
3. Join together.
4. Compare.
5. Metal.
6. Crease.
7. Hard lumps, formed in furnace.

S.W.C.

• • • •

SOLUTIONS TO LAST MONTH'S PUZZLES

The prisoner's way out in our first puzzle last month is shown in the accompanying diagram. The condition of freedom was that he was to walk through each cell in turn once only; in order to walk *through* cell A he had first to step into the next one and then to return through A.



When the vowels are inserted in the collection of letters in our second puzzle, and words are formed from the result, we get "EVERY BOY SHOULD READ THE MECCANO MAGAZINE AS IT IS THE BEST OF ITS KIND IN THE WORLD."

The solutions of the two word building problems are as follows:

A, AS, SAD, DASH, SHADE, SHARED, SHADIER and RADISHES.

I, IT, TIE, TIER, TRICE, DIRECT, PREDICT, DECREPIT and PREDICATE.

The jumbles of our fourth problem were made by mixing up the letters of names of counties. These are: NORTHAMPTONSHIRE; CHESHIRE; WESTMORLAND; DURHAM; GLAMORGANSHIRE; CORNWALL; SOMERSET; WORCESTERSHIRE; DENBIGH; and CAERNARVONSHIRE.

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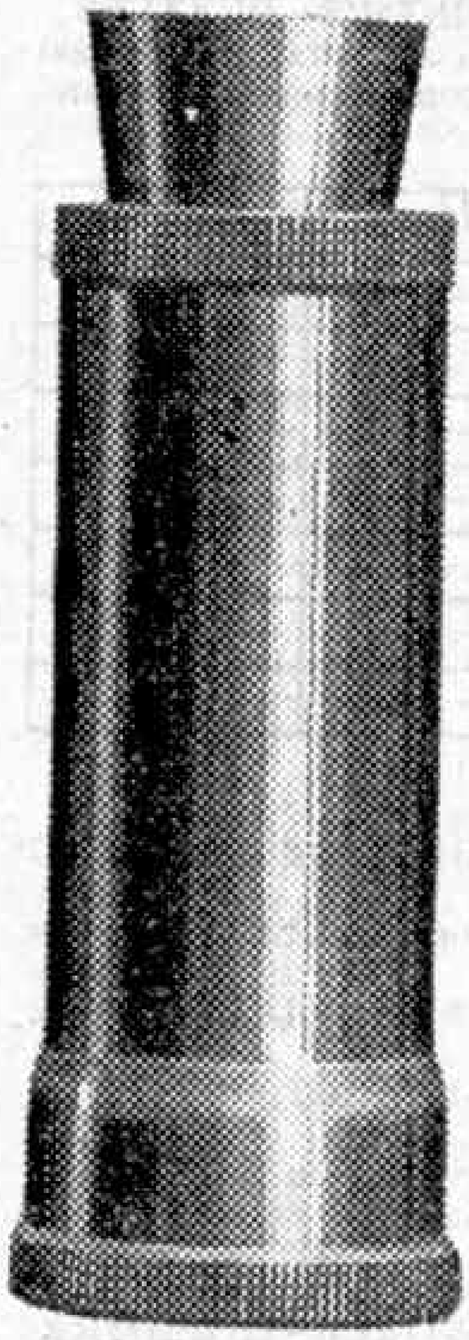

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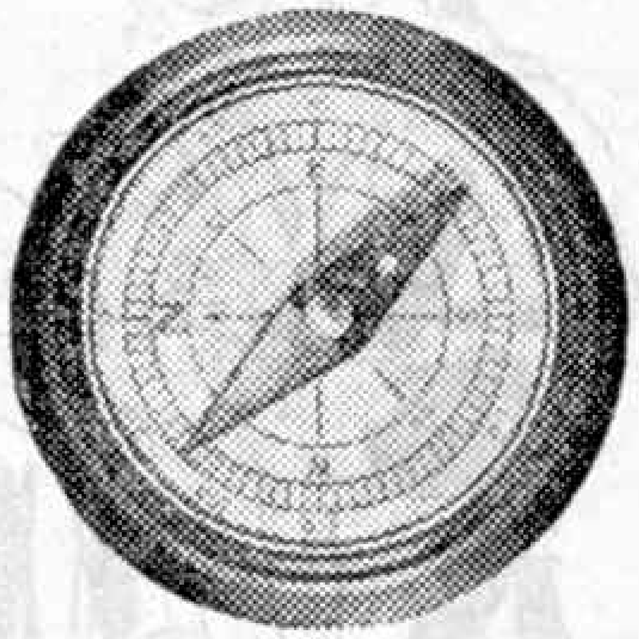

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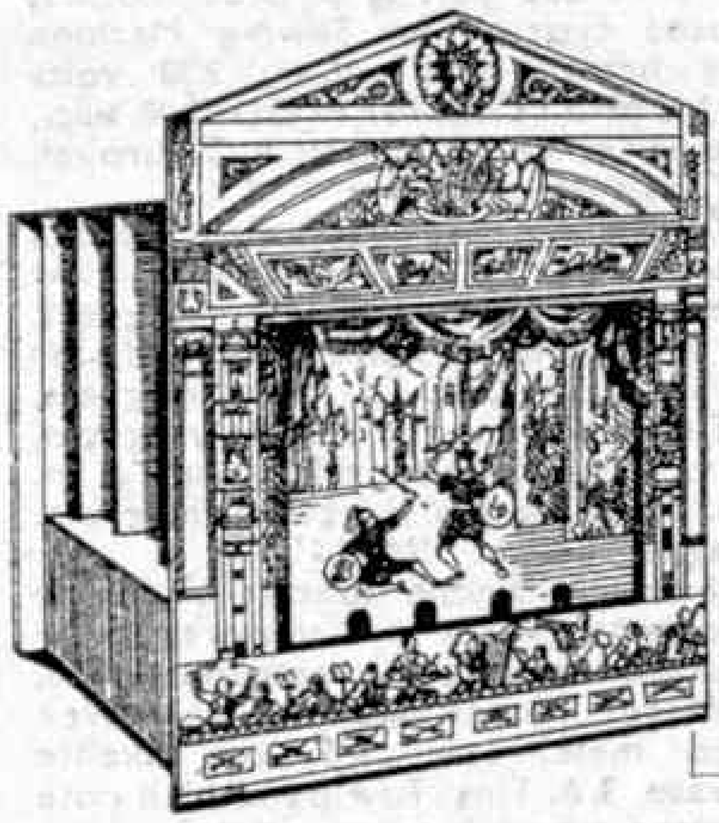

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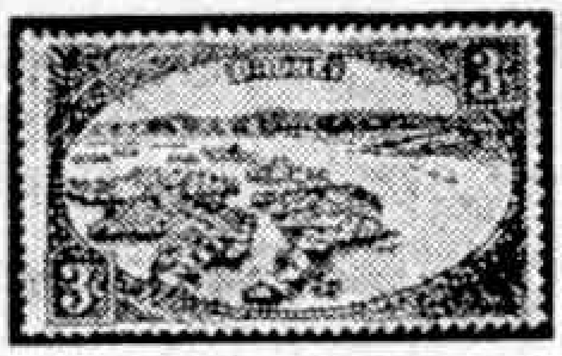

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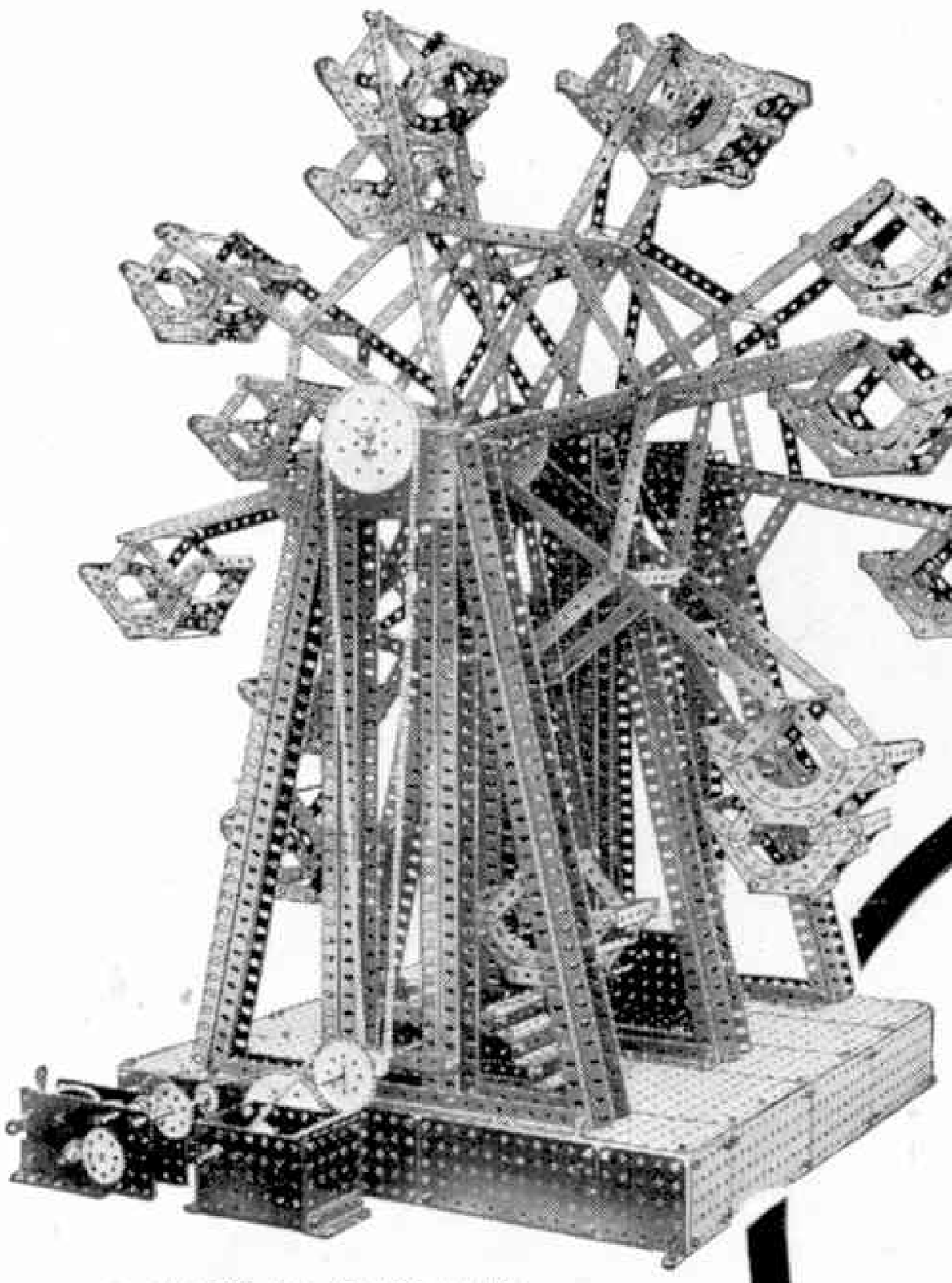

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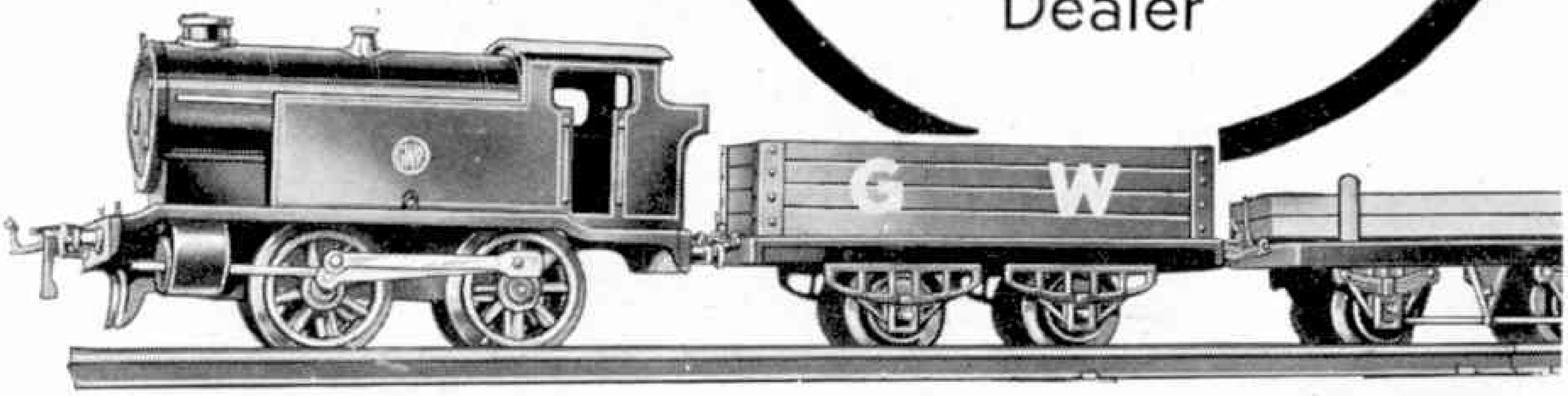

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